

SECTION 16425

MAIN DISTRIBUTION SWITCHBOARD

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish and install the main distribution switchboards as shown, scheduled and detailed on the drawings. The sections and components of the switchboard shall consist of parts which are the product of the same manufacturer and shall be electrically and mechanically coordinated so that the installation shall necessitate only the mechanical connecting of the major items to form totally enclosed deadfront structures complete from the incoming line terminals to the outgoing feeder terminals.

1.02 REFERENCES

- A. FS W-C-375 - Circuit Breakers, Molded Case, Branch Circuit and Service.
- B. NEMA AB 1 - Molded Case Circuit Breakers.
- C. NEMA KS 1 - Enclosed Switches.
- D. NEMA PB 2 - Deadfront Distribution Switchboards.
- E. NEMA PB 2.1 - Instructions for Safe Handling, Installation, Operation and Maintenance of Deadfront Switchboards Rated 600 Volts or Less.
- F. NETA STD ATS - 1987 - Acceptance Testing Specifications for Electric Power Distribution Equipment and System.

1.03 QUALITY ASSURANCE

- A. The Manufacturer shall employ such quality assurance measures as are necessary to ensure that the Work conforms to the requirements of this Section and Section 16012.
- B. Tests in accordance with IEEE and NEMA requiring certified reports and those requiring factory or field inspection shall be conducted and reported to the Contracting Officer as specified herein.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. The switchboard section or assembly shall be contained in a dust and moisture-impervious shrouding and shall be adequately crated to ensure protection from transit damage and exposure to the weather.

- B. Packaging shall be labeled and numbered so that each section or assembly may be identified before being uncrated. Any items not fully assembled to the unit. structure shall be packaged separately. Removable circuit breaker units shall be packaged and shipped separately.
- C. Adequate means shall be provided for lifting by fork lifts and cranes and for moving the equipment on rollers. Lift points shall be marked on each crate.
- D. Where switchboard sections must be separated for shipment, all information, materials, and equipment necessary to facilitate reassembly and reconnection of interconnecting bus work and wiring in the field shall be furnished. Shipping lengths of the assembled equipment shall be in accordance with construction site handling limitations and as shown on the Contract Drawings.
- E. Touch up any damage to finishes to match adjacent surfaces as specified in Part 3 of this Section. Furnish (2) aerosol cans of paint for touch-up purpose and instruction on its application.

1.05 SPARE PARTS AND SPECIAL TOOLS

- A. Furnish one set of all special tools required for the erection, operation, and maintenance of all equipment furnished and installed under this Section.
- B. Furnish a list of recommended spare parts for the switchboard and accessories. The list shall contain the prices and availability of the spare parts recommended.
- C. Provide two (2) sets of spare fuses as required for each component or device in the switchboard installation. Provide a wall-mounted lockable steel cabinet for spare fuse storage.

1.06 SUBMITTALS

- A. Submit the following Shop Drawings, Catalog Cuts and Samples for approval before manufacture of the equipment.
 - 1. Shop Drawings
 - a. Mechanical parts and assemblies, including electrical components, complete connection details, torque requirements, as well as a complete list of parts with full identification.
 - b. Outline drawings indicating overall dimensions, weights, locations or switchgear devices on the panel, aisle space required for drawout equipment, and reference tables to other drawings furnished.
 - c. One line diagram showing all ratings, main connections, and the locations of all current, potential and auxiliary transformers.

June 07, 2002

- d. Complete assembly drawings showing elevations and section views of each non-identical unit.
- e. Foundation plan drawings showing locations of channel sills, anchor bolts, and conduit and grounding entrances.
- f. Complete five line diagrams showing all controls and instruments, including terminal wiring designations.
- g. Instrument transformer characteristic curves and burdens.
- h. Structure drawings showing available space for all conduit and cable connections.
- i. Schematic (elementary) control diagrams for switch control, interlocks, relays, and instruments.
- j. Complete point-to-point wiring diagrams.
- k. Family of time-current characteristic curves for all types and sizes of fuses, relays, and trip devices furnished with the switchboard.
- l. Bill of material for all equipment, devices, components, and nameplates, which shall include complete descriptions, ratings, and locations.
- m. Details for insulation of buses.
- n. Factory assembly tests.
- 2. Catalog Cuts
 - a. Relays
 - b. Metering
 - c. Control switches
 - d. Indicator lamps and sockets
 - e. Terminal blocks

B. Instruction Manuals

- 1. Furnish six (6) complete operation and maintenance manuals when the final shop drawings are submitted.
- 2. Furnish six (6) additional complete instruction manuals, including any required factory corrections, after the equipment has been factory tested.

3. Each instruction manual shall contain the following:
 - a. Calibration data, curves, wiring diagrams and other pertinent information on each and every component furnished.
 - b. Operation Procedures, both manual and automatic.
 - c. Recommended preventive maintenance schedules.

PART 2 - PRODUCTS

2.01 GENERAL

- A. The equipment shall be as manufactured by Westinghouse Electric Corporation, Allen Bradley, the Square D Company, or equal. The equipment shall be rated for voltage and ampere ratings indicated on the drawings.
- B. The sections shall be completely assembled and tested at the factory in accordance with AIEE and NEMA standards for the equipment involved. Adequate lifting and pulling eyes or beams shall be provided to facilitate handling. Switchboard supports for providing proper alignment and support for anchoring to the floor shall be provided.
- C. The arrangement rating and location of circuit breakers and components shall be as indicated. The switchboard shall comply with the Underwriters' Laboratories and shall bear their labels.
- D. The switchboard manufacturer shall submit coordinated characteristics of the trip device so the protective device will operate selectively to minimize the extent of electrical service interruptions. Cascading or Series Rating the protective devices will not be acceptable. Coordinate the circuit breakers with the electrical distribution system.

2.02 COMPONENTS

- A. Construction
 1. The switchboard shall be designed suitable for use as service entrance equipment, front accessible, and consist of one or more vertical structures bolted together to form one sheet metal enclosure. It shall be provided with front and rear channels. The switchboard shall include all protective devices and equipment as listed with necessary interconnections, terminal blocks and mechanical type solderless connectors for all terminals. Barriers shall be provided between adjacent switchboard sections.
 2. All vertical wiring troughs on each section shall be hinged for easy installation and maintenance.
 3. Protective devices shall have individual front plates and necessary bus connection straps. Devices shall be modular sized and so arranged to be individually removable

June 07, 2002

and readily interchangeable. Where space only is indicated, bussing shall be provided for future protective devices.

4. Steel surfaces shall be NEMA 250 Type 3R where exposed to weather and shall be chemically cleaned and treated to provide a bond between paint and metal surfaces to prevent the entrance of moisture and formation of rust under the paint film. The switchboard exterior shall be finished in ANSI-61, Gray.

B. Bus

1. Bus structure shall be sized per the drawings and shall be arranged to permit future extension of additional sections. Bus shall be mounted on insulator supports of high impact, nontracking, high quality insulation material and adequately braced to withstand the mechanical forces exerted during short circuit conditions when connected directly to a source having a maximum of RMS ampere available equal to the asymmetrical rating of the largest circuit breaker in switchboard. The maximum short circuit current available is approximately 65,000 RMS symmetrical amperes. Bus bars shall be silver finished minimum 98% conductivity copper with all bolted or pressure joints for buses, interconnection disconnecting devices and external connections to equipment to be bolted with bolts and Belleville washers to minimize maintenance. All bussing shall be arranged in a manner not to obstruct straight-in wiring to the device. Temperature rise of buses shall meet UL Standard 891 temperature rise.
2. Switchboards shall have a 1/4 by 2 inch minimum size copper ground bus and full-size or 200 percent neutral bus. Ground and neutral bus shall include harmonic compensation and shall be provided with a removable link between the busses in the service entrance equipment. Cable connections between busses is not acceptable. Temperature rise shall not exceed 50°C above a 40°C ambient.
3. A ground bus shall be furnished secured to each vertical section structure and shall extend the entire length of the switchboard. All metallic parts of the switchboard structure shall be bonded to the ground bus.

C. Main Circuit Breaker

1. The circuit breaker for the main shall be a solid state trip unit with an interrupting rating as indicated on the Drawings. Breakers shall be constructed in accordance with UL Standard 489, NEMA Standard AB1-1975 and shall meet the requirements of Federal Specification W-C-375B/GEN as Class 25a. The circuit breakers shall be rated for 100% continuous duty and shall be sized as indicated on the schedules. The circuit breakers shall be fixed-mounted construction and shall have a mechanical indicator to show breaker open or closed position.
2. Circuit breakers shall be constructed using glass reinforced insulating material providing high dielectric strength. The circuit breaker shall contain a two-step stored energy mechanism to provide quick-make, quick-break operation with a maximum five-cycle closing time. Current carrying components shall be completely isolated

June 07, 2002

from the trip unit and accessory mounting area. Breakers shall provide common tripping of all poles and shall be trip-free. Located on the face of the breaker shall be buttons to open and close the breaker and indicators to show the position of the breaker contacts and the status of the closing springs. The integral trip unit shall be independent of any external power source and shall contain reliable electronic components to measure and time the output from integral current sensors and initiate automatic tripping action. The circuit breaker shall be UL listed for reverse connection without requiring special construction. Circuit breakers shall be manually operated as indicated on the drawings. Switch shall be 2-position "on-off" only. Three position switch shall not be acceptable.

3. The circuit breaker shall be provided with timing and tripping circuits for adjustable current setting, instantaneous trip and short time trip. Circuit breakers shall be provided with integral equipment ground fault protection for grounded neutral systems. They may be applied on three phase four wire circuits or three phase three wire circuits where the neutral is grounded but not carried throughout the system.
4. A test set shall be available to provide automatic functional testing of the circuit breakers. No disassembly of circuit breakers shall be required.
5. Breakers shall be equipped with accessories noted on the drawings. In addition, all accessory devices shall be suitable for field installation. UL listing shall be retained when accessory is field installed.
6. Provision shall be made by the manufacturer for mounting the power companies current and potential transformers.

D. Feeder Breakers

1. Breakers shall be constructed in accordance with UL Standard 489, NEMA Standard AB1-1975 and shall meet the requirements of Federal Specification W-C-375B/GEN as Class 25a. The circuit breakers shall be rated and sized as indicated on the schedules. The circuit breakers shall be bolt-on construction.
2. Molded case circuit breakers shall have over-center toggle-type mechanism, providing quick-make, quick-break action. Breakers shall be calibrated for operation in an ambient temperature of 40EC. Each circuit breaker shall have trip indication by handle position and shall be trip-free. Two and three pole breakers shall be common trip. Each circuit breaker shall have a permanent trip unit containing individual thermal and magnetic trip elements in each pole. Circuit breakers shall have variable magnetic trip elements which are set by a single adjustment. The circuit breaker shall be suitable for mounting and operating in any position. Tripping range shall be adjustable between 80% and 160% of the breaker trip rating.
3. Circuit breakers shall have removable tugs. Lugs shall be UL listed for copper conductors. Breakers shall be UL listed for installation of mechanical or compression-type lugs. Terminal strips shall be provided for all control wiring.

4. Breakers shall be equipped with accessories noted on the drawings. In addition, all accessory devices shall be suitable for field installation. UL listing shall be retained when accessory is field installed.
- E. Wiring Components: Small wiring, necessary fuse blocks and terminal blocks within the switchboard shall be furnished when required. All groups of control wires leaving the switchboard shall be provided with terminal blocks with suitable numbering strips.
- F. Nameplates and Labels
 1. Each switchboard section shall have a metal nameplate permanently affixed to it, listing the following information:
 - Name of manufacturer
 - System voltage
 - Ampacity
 - Type
 - Manufacturer's shop order number and date
 2. Each section of switchboard shall bear a UL listing mark, where qualified, and a short circuit rating label.
 3. The front, side rear and top of each switchboard section will have a DANGER label in accordance with NEMA Standard PB-2.
 4. Nameplates for each breaker shall be standard laminated plastic legend plates in accordance with data shown on the schedule. Each nameplate shall be fastened to the steel of the panels with at least two stainless steel screws.
- G. Control and Protective Devices
 1. Provide transient voltage surge protectors per IEEE C62.14 to protect control systems.
- H. Instrumentation
 1. Provide instrument transformers per NEMA EI 21.1, IEEE C57.13 and the drawings.
 2. Accuracy tolerance on instrumentation system shall meet industry standards with maximum of 2%".
 3. Switches shall be rotary with off position.
 4. Voltmeter and ammeter shall read all phases.

PART 3 - EXECUTION

3.01 FACTORY ASSEMBLY AND TESTS

- A. The switchboard shall be completely assembled, wired, adjusted and tested at the factory. After assembly, the complete switchboard will be tested for operation under simulated service conditions to assure the accuracy of the wiring and the functioning of all equipment.
- B. The main circuit shall be given a dielectric test of 2200 volts for one minute between live parts and ground, and between opposite polarities. The wiring and control circuits shall be given a dielectric test of 1500 volts for one minute between live parts and ground.
- C. Results of factory tests shall be submitted when requested by the Contracting Officer.
- D. Handle and install the switchboard per manufacturer's instructions and the drawings.

3.02 SHIPMENT

- A. Package switchboards as specified in Part 1.
- B. Deliver switchboard to the site to the location designated by the Construction Manager.
- C. Contractor shall be responsible for any damage from shipment or storage.

3.03 INSTALLATION

- A. Install per manufacturer's and NEC requirements.

END OF SECTION

SECTION 16670

LIGHTNING PROTECTIVE SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION

A. The work includes the following:

1. Provision for a complete Lightning Protective System with all component parts as specified herein.
2. Grounding equipment furnished as required, for connection to the building, structures or the roof system.
3. Lightning protection system for all new and existing structures on site.

B. Related work described elsewhere:

1. Division 1 - General Requirements.
2. Applicable requirements of other Sections of Division 16 as shall apply to this Section.

1.02 REFERENCES

ANSI/NFPA 78 - Lightning Protection Code

ANSI/UL 96 - Lightning Protection Components

UL 96A - Installation Requirements for Lightning Protection

LPI - Lightning Protection Institute

1.03 SYSTEM

- A. The lightning protection system shall be designed and installed in accordance with the requirements of UL 78 and 96A to obtain a UL Master Label approval on the buildings.
- B. The system shall include air terminals on the roofs; bonding of roof-mounted mechanical equipment and stacks; bonding of structure and other metal parts; ground conductors and ground rods; with necessary cable, connectors, bonding straps, fasteners, clamps and all other equipment and materials necessary for a complete lightning protective system for the buildings and UL Master Label acceptance.

1.04 SUBMITTALS

- A. Submit shop drawings and product data for the system under provisions of Section 16010 - Basic Electrical Requirements.
- B. Submit shop drawings showing layout of air terminals, grounding electrodes, and bonding connections to structure and other metal objects. Include terminal, electrode, and conductor sizes, and connection and termination details.
- C. Submit product data showing description, dimensions and materials of each component, and include indication of listing in accordance with ANSI/UL 96.
- D. The manufacturer/installer shall submit for approval one reproducible drawing of installation drawings of each building indicating all work required for this item including ground rod locations, air terminal locations and cable locations. Catalog cuts of all components shall also be submitted for approval by the Contracting Officer. Three prints of drawings shall be submitted for initial approval and five prints shall be submitted after approval.
- E. Submit manufacturer's installation instructions under provisions of Section 16010.

1.05 PROJECT RECORD DOCUMENTS

- A. Submit project record documents under provisions of Section 16010.
- B. Accurately record actual locations of air terminals, grounding electrodes, bonding connections, and routing of system conductors.

1.06 QUALIFICATIONS

- A. Manufacturer: Must provide qualification evidence showing their company as specializing in lightning protection equipment with a minimum five years documented experience and also be a member of the Lightning Protection Institute.
- B. Installer: Provide certification on the authorized installer of manufacturer as having a minimum five years documented experience and be a member of the Lightning Protection Institute.
- C. Provide a list of prior successful lightning protection installations with contact information on the Owners.

1.07 SEQUENCING AND SCHEDULING

- A. Coordinate work with other building systems' installations under provisions of Section 16010.
- B. Coordinate the work of this Section with roofing and exterior and interior finish installation contractors.

June 07, 2002

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Materials shall be new and first quality commercial products. Standard fittings shall be used where approved under UL Master Label, in preference to special fittings.
- B. Materials shall comply in weight, size and composition with the requirements of ANSI/UL 96 Master Label and the National Fire Protection Code relating to this type of structure.
- C. Lighting rod equipment and fittings shall bear the label of the Underwriters' Laboratories, Inc.
- D. Air terminals. Air terminals according to UL Master Label and to plans shall be one piece, solid copper, short blunt points, similar to IPC No. 331-1/2" x 12" or 24" length, brazed or threaded in an approved manner, or cast integral with a copper or approved alloy base of heavy, substantial construction. Similar to IPC No. 60, No. 67X, No. 174 or 60X depending upon building design.
 - 1. The top or point shall be of solid copper, or an approved alloy, with a short blunt tip. The base diameter, exclusive of a shoulder hub, shall be not less than 1/2 inch nor greater than 3/4 inch.
 - 2. The bases shall be of ample size, symmetrical, and provided with means for securely supporting the air terminals to the buildings. Bases shall be securely attached to the buildings and shall be set for vertical alignment of air terminals at all locations.
- E. Conductors. Ground and bonding conductors shall be fabricated of 28 strand x .066 AWG soft drawn copper wires, having a conductivity of at least 98 percent of that of pure copper at 20°C twisted to form a rope lay cable, having a weight of approximately 375 pounds per 1,000 feet and that will not splay on bending. IPC catalog No. 40.
- F. Fasteners. Fasteners for holding the air terminals to the railing or parapet supports shall be of copper, brass or bronze designed to hold the conductors securely and close to the supports, and shall be placed per UL Master Label approximately 24 inches apart, IPC No. 84B or No. 121A.
 - 1. Fasteners shall be not less than No. 14 AWG in thickness and shall be bolted to the supports with 1/4 inch diameter, brass or bronze, hexagonal headed machine bolts similar to IPC No. 123, No. 124 or No. 265A depending on application.
- G. Ground rods. Ground rods shall be non-rusting "Copper-weld" 3/4 inch in diameter by 10 feet long, similar to IPC catalog No. 579, each with the top chamfered or threaded and the bottom pointed to facilitate driving. The proportions of copper and steel shall be such that the conductance of the rod will be not less than 30 percent of the conductance of an equivalent cross-section of solid copper. Each rod shall have the length stamped plainly near the top. The exterior copper coating shall be permanently and effectively welded to the steel core. The ground clamp shall be of cast bronze with safety set screws suitable for ground conductors equal to stranded copper cables, approximately 1/2 inch in diameter, IPC catalog

June 07, 2002

No. 52A. Ground connection shall be made to the water main in the building in addition to the artificial grounds with IPC clamp No. 117A. Threaded tops on rods require protection for driving, but allow multiple rods in locations where ground resistance is high.

H. Connectors. Connectors for attaching the ground cables to the buildings' metal supports shall be of the flat-to-cable type not less than No. 8 AWG in thickness and shall be bolted to the supports with 1/2" diameter, brass or bronze hexagonal headed machine bolts, similar to IPC catalog No. 238 or 238B or 235W.

1. Connectors and connector hardware shall be of copper, brass, bronze or other approved non-ferrous metal.
2. Connectors for bonding conductors to pipes shall be in the form of approved bonding clamps having ample provisions for accommodating the conductors and for establishing positive contacts to objects so bonded. Similar to IPC No. 117, No. 117A or No. 117B or No. 306, No. 306X, 306A, or 306B depending on size of pipes.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Verify that field measurements are as shown on Drawings.
- C. Beginning of installation means installer accepts existing conditions.

3.02 PROTECTION OF SURROUNDING ELEMENTS

- A. Protect elements surrounding work of this Section from damage or disfiguration.

3.03 INSTALLATION

- A. General. The system shall be installed in accordance with the current edition of UL 96A "Installation Requirements for Master Labeled Lightning Protection Systems" by the Underwriters' Laboratories, Inc.
 1. No ferrous fasteners, nor ferrous holding devices of any kind shall be employed as permanent fasteners.
 2. Individual anchor bolts, employed in this installation, shall each have a pullout resistance of not less than 100 pounds as determined by actual test.
 3. The installation shall be made in a most conspicuous manner. Conductors shall be coursed on the backside of architectural construction to conceal equipment as much as possible.

June 07, 2002

4. Cable connections shall use approved exothermic weld connections between conductors and/or other components except where indicated.
- B. Air terminal-installation. Air terminals shall be installed as required by the Underwriters' Laboratories, Inc. Master Label approval.
 1. Air terminals shall have their points aligned vertically and their bases shall be bolted or welded to the buildings.
 2. Comply with UL 96A, LPI-175, and NFPA 780.
- C. Conductors-Installation. Conductors for ground rod connections shall be tap-bolted to the buildings' metal supports by means of flat-to-cable type connectors and shall be connected to the ground rods with ground clamps allowing a reasonable amount of slack conductor for expansion and contraction. Steel surfaces shall be clean and bright before applying connectors. Bends in these conductors shall have no angle less than 90E at a minimum radius of 8 inches. Connectors shall, when fixed to conductors, be capable of withstanding a pull of 200 pounds.
 1. Bonding conductors shall be connected to the bonding clamps allowing a reasonable amount of slack conductor for expansion and contraction and the conductor bonds shall be limited as stated above.
 2. All metal fascia, television masts, ventilators and vents shall be bonded.
 3. Conductors shall be concealed, where indicated.
- D. Ground-installation. Ground terminal installation shall be made at all locations indicated on the Drawings, and at such other points as may be found necessary to properly ground the system.
 1. All grounds shall be made by means of rods driven into the soil which shall penetrate vertically not less than 10 feet below the finished surface of the ground and passing approximately 2 feet away from the building foundations. Top of ground rod shall be 6 inches below grade.
 2. In case the measured resistance of the ground system exceeds 25 ohms per terminal, the subcontractor shall increase the number of ground rods, at the direction of the Contracting Officer in order to meet the specified requirements of NEC.
 3. A stamped tag of non-corrosive metal shall be attached to the metal support for each building adjacent to each ground connection, to indicate the location and arrangement of the rods and final value of the resistance at time of installation.
- E. Where cables penetrate the roofing membrane, penetrations shall be permanently sealed per roof manufacturer's recommended methods.

3.04 CORROSION PROTECTION

- A. Do not combine materials that can form an electrolytic couple that will accelerate corrosion in the presence of moisture, unless moisture is permanently excluded from the junction of such materials.
- B. Use conductors with protective coatings where conditions would cause deterioration or corrosion of conductors. Provide special connectors for any bimetallic (i.e., aluminum to copper) connections or contact.

3.05 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 16010.
- B. Obtain the services of Underwriters Laboratories, Inc. to provide Master Label inspection and certification of the lightning protection system under provisions of UL 96A.
- C. The Contractor shall be responsible for meeting all requirements for UL Master Label approval.
- D. Obtain UL Master Label nameplate and attach to the building at the location designated by UL 96A.
- E. Provide the Government with UL Master Label certification documentation.

3.05 GUARANTEE

- A. The subcontractor shall repair to Government satisfaction any faults or defects arising from defective or improper materials or workmanship which may appear in the work within one year from the date of final acceptance of the work.

END OF SECTION

SECTION 16720

FIRE ALARM SYSTEM

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. This section of the specification includes the furnishing, installation, and connection of a new microprocessor-based addressable or hard-wired fire alarm system required to form a complete coordinated system ready for operation. It shall include, but not be limited to, fire alarm control, alarm initiating devices, alarm notification appliances, auxiliary control devices, power supplies, and wiring as shown on the drawings and specified herein. The design system is Simplex or equal.
- B. The fire alarm system shall comply with requirements of NFPA Standard No. 72 for protected premises signaling systems except as modified and/or supplemented by this specification. The system shall be capable of on-site programming.
- C. The system shall be an active type system where each device causes an LED signal to be transmitted to the Main Fire Alarm Control Panel (FACP) indicating that the zone and its associated circuit wiring is functional. Loss of this signal at the main FACP shall result in an LED and audible trouble indication as specified on the drawings or hereinafter for the particular zone.
- D. The system shall be provided with 24 VDC standby battery power capable of 60-hour life in supervisory mode and a final 10-minute alarm before shutdown. Battery system shall be auto-charged and trouble-monitored.
- E. The alarm system shall have the capability of recalling "in memory" alarms and trouble conditions in chronological order to recreate an alarm event history.
- F. The operation of any fire detection system or manual alarm shall automatically:
 - 1. Notify the Fire Department.
 - 2. Sound an alert signal to all required locations.
 - 3. Activate the evacuation signal.
- G. The Control Panel shall include alarm verification operation for the smoke detector zones, which incorporates a 1-minute alarm verification. If no second alarm is received, the zone will reset automatically to normal mode. A verification second alarm will activate the alert system.
- H. A manual evacuation (drill) switch shall be provided to operate the alarm indicating appliances without causing other control circuits to be activated. A true alarm will override the test conditions.

- I. The Control Panel shall be served by a dedicated 120 Volt single-phase circuit. The 24 VDC alarm system shall automatically transfer to standby battery upon power failure.

1.02 RELATED WORK

- A. The work of this Section shall hereby include Section 16010 - Basic Electrical Requirements.
- B. Section 16050 - Basic Electrical Materials and Methods.
- C. Section 16900 - Inspection and Electrical Test Procedures.

1.03 REFERENCES

- A. The fire detection system shall be installed in accordance with the specifications, drawings, and the requirements of NFPA-72, National Electric Code 760 and in accordance with (ADA) American Disabilities Act.
- B. The installing company shall employ NICET (minimum Level II Fire Alarm Technology) technicians on site to guide the final check-out and to ensure the systems integrity.
- C. All conduit wiring and fire alarm equipment shall be wired as follows:
 1. Initiation Device Circuits (IDC) shall be wired Class A (NFPA Style D).
 2. Notification Appliance Circuits (NAC) shall be wired Class A (NFPA Style Z).
- D. Work of this section shall be coordinated with other contract work.

1.04 SUBMITTALS

- A. General:
 1. Submittals shall be submitted for review in accordance with Section 16010, Basic Electrical Requirements.
 2. All references to manufacturers and other pertinent information herein is intended to establish minimum standards of performance, function and quality. Equivalent equipment (compatible UL Listed) from other manufacturers may be substituted for approval as the specified equipment as long as the minimum standards are met and equipment is compatible with the design system.
 3. All substitute equipment proposed as equal to the equipment specified herein, shall meet or exceed the standards. For equipment other than that specified, the contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment.

B. Shop Drawings:

1. Sufficient information on the design system and equipment, clearly presented, shall be included to determine compliance with drawings and specifications.
2. Include manufacturer's name(s), model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.
3. Show annunciator layout and main control panel module layout with configurations and terminations.

C. Manuals:

1. Submit 10 complete operating and maintenance manuals listing the manufacturer's name(s) including technical data sheets at completion of project in accordance with Section 16010, Basic Electrical Requirements.
2. Wiring diagrams shall indicate internal wiring for each item of fire alarm system equipment and the interconnections between the items of equipment.
3. Provide a clear and concise description of operation that provides the information required to properly operate the equipment and system.
4. The Contracting Officer acceptance and Government approvals will be based on complete submission and review of shop drawings.

D. Certifications:

Together with the shop drawing submittal, submit a certification from the successful bid equipment manufacturer indicating that the proposed supervisor of installation and the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer. Include names and addresses in the certification. Performance and operating system test shall be conducted in the presence of the Contracting Officer or his representative.

1.05 WARRANTY

All work performed and all material and equipment furnished under this contract shall be free from defects and shall remain so for a period of at least one (1) year from the date of acceptance. The full cost of maintenance, labor and materials required to correct any defect during this one year period shall be included in the submittal bid. Manufacturer's material and service shall be available within a 50-mile radius.

1.06 POST CONTRACT MAINTENANCE

June 07, 2002

- A. Complete maintenance and repair service for the fire alarm system shall be available from a factory trained authorized representative for a period of five (5) years after expiration of the guaranty. The manufacturer shall be prepared to offer a warranty contract beyond the one-year period.
- B. After system acceptance, provide the Government with a quote for a maintenance contract to provide all maintenance, test, and repair described below. Include also a quote for unscheduled maintenance/repair, including hourly rates for technicians trained on this equipment, and response travel costs. Submittals that do not identify all post contract maintenance costs will not be accepted. Rates and costs shall be valid for a five (5) year period after the expiration of the guaranty.
- C. Maintenance and testing shall be on a semiannual basis or as required by the local agent. A preventive maintenance schedule shall be provided which describes the procedures for preventive maintenance. The schedule shall include:
 - 1. Systematic examination, adjustment and cleaning of all detectors, manual fire alarm stations, control panel, power supplies, relays and all accessories of the fire alarm system.
 - 2. Each circuit in the fire alarm system shall be tested semiannually.
 - 3. Each smoke detector shall be tested in accordance with the requirements of NFPA 72.

1.07 APPLICABLE PUBLICATIONS

The publications listed below form a part of this specification. The publications are referenced in text by the basic designation only.

A. National Fire Protection Association (NFPA):

No. 70	National Electric Code (NEC)
No. 72-1996	National Fire Alarm Code
No. 101	Life Safety Code

B. Underwriters Laboratories Inc. (UL):

No. 50	Cabinets and Boxes
No. 268	Smoke Detectors for Fire Protective Signaling Systems
No. 864	Control Units for Fire Protective Signaling Systems
No. 521	Heat Detectors for Fire Protective
No. 228	Door Closers-Holders for Fire Protective Signaling Systems.
No. 464	Audible Signaling Appliances.
No. 38	Manually Actuated Signaling Boxes.
No. 1481	Power supplies for Fire Protective Signaling Systems.
No. 1076	Control Units for Burglar Alarm Proprietary Protective Signaling Systems.
No. 1971	Visual Notification Appliances.

C. Local and State Building Codes - Authority Having Jurisdiction (AHJ).

D. Requirements of the American Disabilities Act (ADA).

1.08 APPROVALS

A. The fire alarm system must have proper listing and/or approval from the following nationally recognized agencies:

NFPA National Fire Protection Agency

UL Underwriters Laboratories Inc

FM Factory Mutual

B. Modular Labeling

The fire alarm control panel shall meet the modular listing requirements of Underwriters Laboratories Inc. To facilitate system changes and expansions, and to ensure that all subassemblies have the proper listing, each subassembly of the FACP shall carry the appropriate UL modular label. This includes, but is not limited to, all printed circuit board assemblies, power supplies, and enclosure parts.

1.09 QUALITY ASSURANCE

A. All fire alarm system products shall be those of a single manufacturer and bear the "UL" label. All control equipment shall be listed under UL Category "UOJZ" as a single control unit. Partial listing shall not be acceptable.

B. All control equipment shall have transient protection to comply with UL 864.

C. The manufacturer of the fire alarm system shall have a minimum of 10 years of successful installation experience.

PART 2 - PRODUCTS

2.01 EQUIPMENT AND MATERIAL, GENERAL

A. All equipment and components for the system shall be new. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protected premises protective signaling (fire alarm) system. The authorized representative of the manufacturer of the major equipment, such as control panels, shall be responsible for the satisfactory installation of the complete system.

- B. All equipment and components shall be installed in strict compliance with manufacturers' recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation.
- C. All equipment shall be attached to walls and ceiling/ floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load with a minimum safety factor of 3.
- D. The Control Panel shall be expandable with solid-state microprocessor-based electronics. Keyboard or keypads shall not be required to operate the system during fire alarm conditions.
- E. A local audible device shall sound during alarm conditions. This audible device shall also sound upon any key press to confirm the key press is correct.
- F. The Control Panel shall use backlighted liquid crystal display for readable clarity. During AC outage, the display under battery power shall only be lighted for alarm or keyboard activity.
- G. The Control Panel shall be capable of operating all connected devices with 10% spare capacity.
- H. An "alarm silence" button shall silence all activated alarms, but retain an LED display until the system is reset.
- I. Alarm system reset shall require all alarm clearances and a procedure through manufacturer's reset process per the operations manual.
- J. The alarm system shall be capable of being tested by one person.
- K. All LED's shall be monitored for burnout or failure. Any LED problem shall be identified on the module to facilitate location and repair.
- L. The following primary controls shall be visible through the front access panel:
 - 1. Liquid crystal display
 - 2. Red system alarm - LED
 - 3. Yellow supervisory service - LED
 - 4. Yellow trouble - LED
 - 5. Green "Power On" - LED
 - 6. Alarm Acknowledge key
 - 7. Supervisory Acknowledge key
 - 8. Trouble Acknowledge key
 - 9. Alarm silence key
 - 10. System reset key

2.02 CONDUIT AND WIRE

A. Conduit:

1. Conduit shall be installed in accordance with Section 16050, the National Electrical Code (NEC), local and state requirements.
2. All wiring shall be installed in conduit or raceway. Conduit fill shall not exceed 40 percent of interior cross sectional area per NEC where three or more cables are contained within a single conduit.
3. Cable must be separated from any open conductors of Power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, as per NEC Article 760-29.
4. Wiring for 24 volt control, alarm notification, emergency communication and similar power-limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.
5. Conduit shall not enter the fire alarm control panel, or any other remotely mounted control panel equipment or backboxes, except where conduit entry is specified by the FACP manufacturer.
6. Conduit shall be 3/4 inch (19.1 mm) RGS minimum.

B. Wire:

1. All conductor and cable for the fire alarm system wiring must be new.
2. Wiring shall be in accordance with local, state and national codes (e.g., NEC Article 760) and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 18 AWG (1.02 mm) for initiating device circuits and signaling line circuits, and 14 AWG (1.63 mm) for notification appliance circuits.
3. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.
4. Wire and cable not installed in conduit shall have a fire resistance rating suitable for the installation as indicated in NFPA 70 (e.g., FPLR). No splices shall be allowed in conduit runs.
5. The system shall permit the use of IDC and NAC wiring in the same conduit with the multiplex communication loop.
6. All field wiring shall be completely supervised. In the event of a primary power failure, disconnected standby battery, removal of any internal modules, or any open

circuits in the field wiring; a trouble signal will be activated until the system and its associated field wiring are restored to normal condition.

- C. Terminal Boxes, Junction Boxes and Cabinets:
 - 1. All boxes and cabinets shall be UL listed for their use and purpose.
- D. Initiating circuits shall be arranged to serve like categories (manual, smoke, waterflow). Mixed category circuitry shall not be permitted except on signaling line circuits connected to intelligent reporting devices.
- E. Door Holders and Electric Locks:
 - 1. Door holders and electric locks shall be UL listed and shall interface with the alarm to release upon alarm activation.

2.03 SYSTEM COMPONENTS

- A. Strobe lights shall meet the requirements of the ADA, UL Standard 1971 and shall meet the following criteria:
 - 1. The maximum pulse duration shall be 2/10 of one second.
 - 2. Strobe intensity shall meet the requirements of UL 1971.
 - 3. The flash rate shall meet the requirements of UL 1971.
 - 4. Strobe lights shall be synchronized with all other strobe lights and all audio/visual combination devices.
 - 5. Strobe lights shall be flush wall-mounted in new construction and wherever possible and surface mounted using manufacturer provided type "FS" backboxes in existing building where flush mounting is not possible.
- B. Audible/Visual Combination Devices:
 - 1. Shall meet the applicable requirements of Section A listed above for audibility.
 - 2. Shall meet the requirements of Section B listed above for visibility.
 - 3. Audio/visual combination devices shall be synchronized with all other audio/visual combination devices and all strobe lights.
 - 4. Audio/visual combination devices shall be flush wall mounted in new construction and wherever possible and surface-mounted using manufacturer provided type "FS" backboxes in existing building where flush mounting is not possible.

June 07, 2002

- C. Duct Smoke Detectors: Duct smoke detectors shall be a 24 VDC type and shall be furnished and installed under Division 15 and fire alarm wired under this Section. Associated remote test indicating stations shall be furnished under Division 15, but installed and fire alarm wired under this section.
- D. Waterflow Indicator:
 - 1. Waterflow Switches shall be an integral, mechanical, non-coded, non-accumulative retard type.
 - 2. Waterflow switches shall be fire alarm wired and connected under this section but furnished and installed under Division 15 by the fire protection contractor.
 - 3. Where possible, waterflow switches shall be located a minimum of one (1) foot from a fitting which changes the direction of the flow and a minimum of three (3) feet from a valve.
- E. Sprinkler and Standpipe Valve Supervisory Switches:
 - 1. Each sprinkler system water supply control valve riser, zone control valve, and standpipe system riser control valve shall be equipped with a supervisory switch. Standpipe hose valves, and test and drain valves shall not be equipped with supervisory switches.
 - 2. PIV (post indicator valve) or main gate valves shall be equipped with a supervisory switch.
 - 3. The switch shall be mounted so as not to interfere with the normal operation of the valve and adjusted to operate within two revolutions toward the closed position of the valve control, or when the stem has moved no more than one-fifth of the distance from its normal position.
 - 4. The supervisory switch shall be contained in a weatherproof aluminum housing, which shall provide a 3/4-inch (19 mm) conduit entrance and incorporate the necessary facilities for attachment to the valves.
 - 5. The switch housing shall be finished in red baked enamel.
 - 6. The entire installed assembly shall be tamper proof and arranged to cause a switch operation if the housing cover is removed, or if the unit is removed from its mounting.
 - 7. Valve supervisory switches shall be fire alarm wired and connected under this section and furnished and installed under Division 15 by the fire protection contractor.
- F. Pull Box (manual station)

June 07, 2002

1. All operated stations shall have a positive, visual indication of latch operation and utilize a key type reset. Pull stations shall be single-action-type and shall be UL listed.
2. Manual stations shall be constructed of high impact red Lexan with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front of the stations in raised letters, 1.75 inches (44 mm) or larger. Key operation shall be common with the Control Panel. No Allen key or special tools will be allowed.
3. Manual stations shall be flush wall mounted in new construction and wherever possible, and surface mounted using manufacturer provided type "FS" backboxes in existing building where flush mounting is not possible.

G. Photoelectric Smoke Detector

1. The detectors shall be solid state photoelectric (light- scattering) principal in measuring smoke density and use a refracted infrared LED light source with seals against rear air entry.
2. The detector shall fit into a base common to both heat and smoke-type detectors. Spare heads and bases shall be provided.
3. There shall be no limit to number of detectors which may be activated, "in alarm" simultaneously.

H. Thermal Detectors

1. Thermal detectors shall be devices rated at 135 degrees Fahrenheit (58 degrees Celsius) and have a rate-of-rise element rated at 15 degrees F (9.4 degrees C) per minute.

I. Annunciators

1. Annunciator shall be microprocessor solid-state design.

J. Audible/Visual Units (Xenon Strokes)

1. Audible/visible units shall include separate horn and Xenon flash tube units entirely solid state.
2. Visual units shall be solid state with Xenon flash tube construction in single gang, surface mount box. Minimum light output shall conform to ADA at 75 cd.
3. Visual units shall be installed according to drawings, specifications, NEC and manufacturer's recommendations.

K. Emergency Batteries and Cabinet

1. The emergency battery system shall be capable of maintaining the fire alarm operation in excess of 60 hours.
2. Batteries, charger system and cabinet shall be the product of a single manufacturer.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Installation shall be in accordance with the NEC, NFPA 72, local and state codes, as shown on the drawings, and as recommended by the equipment manufacturer.
- B. All conduit, junction boxes, conduit supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage. Fire alarm wiring shall not be installed with any power or lighting system conductors. Enroute splices or wire nuts are not allowed.
- C. All fire detection and alarm system devices shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.
- D. Wiring details shown on the drawings is approximate only and final wiring shall be based upon manufacturer's wiring diagrams, at no increased cost to the Government.
- E. The manufacturer shall provide complete one-line schematic wiring diagrams for all specified fire alarm systems.
- F. All equipment connected to alternating current circuits shall be protected by surge arresters for IEEE C62.41 and NFPA 70.
- G. The fire alarm system shall be connected to building ground per the manufacturer's instructions. Maximum readings to ground shall meet NEC requirements. A final reading of 5 ohms or less is recommended.

3.02 TYPICAL OPERATION

- A. Actuation of any manual station, smoke detector, heat detector or water flow switch shall cause the following operations to occur unless otherwise specified:
 1. Activate all notification circuits until silenced.
 2. Actuate all strobe units until the panel is reset.

3. Annunciate the active initiating devices and zones.
4. Release all magnetic door holders to doors to adjacent zones on the floor from that the alarm was initiated.
5. Return all elevators to the primary or alternate floor of egress.
6. A smoke detector in any elevator lobby shall, in addition to the above functions, return all elevators to the primary or alternate floor of egress.
7. Smoke detectors in the elevator machine room or top of hoistway shall return all elevators in to the primary or alternate floor.
8. Activation of any sprinkler system low-pressure switch, or valve tamper switch shall cause a system supervisory alarm indication.

3.03 TEST

- A. Provide the service of a competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment to technically supervise and participate during all of the adjustments and tests for the system. The Contracting Officer and/or the Government shall be notified of the planned test date to complete their attendance.
 1. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.
 2. Close each sprinkler system flow valve and verify proper supervisory alarm at the FACP.
 3. Verify activation of all flow switches.
 4. Open initiating device circuits and verify that the trouble signal actuates.
 5. Open signaling line circuits and verify that the trouble signal actuates.
 6. Open and short notification appliance circuits and verify that trouble signal actuates.
 7. Ground initiating device circuits and verify response of trouble signals.
 8. Ground signaling line circuits and verify response of trouble signals.
 9. Ground notification appliance circuits and verify response of trouble signals.
 10. Check presence and audibility of tone at all alarm notification devices.
 11. Check installation, supervision, and operation of all intelligent smoke detectors during a walk test.

June 07, 2002

12. Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the existing FACP and the correct activation of the control points.
13. When the system is equipped with optional features, the manufacturer's manual should be consulted to determine the proper testing procedures. This is intended to confirm verifying controls performance on individually addressed or grouped devices, including sensitivity monitoring, location, verification and other alarm functions.

3.04 FINAL INSPECTION

- A. At the final inspection a factory-trained representative of the manufacturer of the major equipment shall demonstrate to the Contracting Officer and/or the Government that the systems function properly in every respect. The Government shall reserve the right of final approval.

3.05 INSTRUCTION

- A. Provide 8 hours instruction for 3 days on operating the fire alarm system. Hands-on demonstrations of the operation and maintenance of all system components and the entire system including program changes and functions shall be provided.
- B. The contractor and/or the systems manufacturer's representatives shall provide 10 copies of a typewritten "Sequence of Operation" to the Government for the installed fire alarm system.
- C. Coordinate all training sessions with the Government and/or the Contracting Officer.
- D. Training shall be conducted by technical personnel in the direct employ of the fire alarm manufacturer. A third party instructor shall not be acceptable.

END OF SECTION

SECTION 16740

TELECOMMUNICATIONS WIRING SYSTEM

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Design, furnish and install all labor material, equipment and service for a complete telephone wiring system between the buildings, as indicated.
- B. Design, furnish and install and provide all labor, material, equipment and service for a complete fiber optic cable installation between hubs, the buildings as indicated.
- C. Design, furnish and install and provide all labor, material, equipment and service for a complete cable TV wiring system between buildings, as indicated. Refer to Section 16782 for CTV wiring system. This work shall be included under Alternate Bid Item No. 4.
- D. The design of each wiring system (telephone, fiber optic, CTV) shall include but is not limited to:
 - 1. Coordinate system requirements with the Government.
 - 2. The overhead and underground trunk wiring system installation details, including anchoring of equipment and appurtenances and equipment relationship to other parts of the work, including clearances for operations and maintenance.
 - 3. Wiring diagrams and details required to provide that the distribution system shall properly support connectivity from the main Communications Room to all building service entrances.
 - 4. Provide drawings indicating the proposed layout, depicting the final system configurations, including equipment locations, splices, wire sizes, termination arrangements, and termination block layouts.
 - 5. Provide a Bill of Materials of all equipment wiring, termination equipment, as well as Government-furnished equipment necessary for complete systems.

1.02 RELATED SECTIONS

- A. Applicable requirements of other Sections of Division 16 shall apply to this section.
- B. Refer to Section 01010 for Government-furnished products that shall be used under this section.
- C. Refer to Section 16782 for additional requirements for Cable Television System.

1.03 ALTERNATES

- A. Refer to Alternate Bid Items, Section 01030 - Alternates, for work affected under this section.

1.04 REFERENCES

- A. All materials and installation shall be in accordance with the latest standards of the following:

1. Federal Communications Commission (FCC) Rules and Regulations:

Part 68 Connection of Terminal Equipment to the Telephone Network (Code of Federal Regulations 47, October 1984)

2. U.S. Department of Agriculture, Rural Electrification Administration Publication:

Form 522 General Specification for Digital, Stored Program Controlled Central Office Equipment

Bulletin 345-67 Rural Electrification Administration Specification for Filled Telephone Cables

Bulletin 1753F-601
(PE-90) Rural Electrification Administration Specification for Filled Fiber Optic Cables

3. American National Standards Institute (ANSI) Standards:

C2-1997 National Electrical Safety Code

C84.1-1982 Electric Power Systems and Equipment-voltage Ranges (60 Hz)

X3.166-1990 Fiber Data Distribution Interface (FDDI)

Token Ring Physical Layer Medium Dependent (PMD)

Current Proposed - Fiber Channel, Physical Level (FC-PH)

4. Electronic Industries Association (EIA) Publications:

RS-232-C Interface between Data Terminal Equipment and Data Communication: Equipment employing serial binary data interchange

RS-455 Standard Test Procedures for Fiber Optic Fibers, Cables, Transducers, Connecting and Terminating Devices

June 07, 2002

5. Electronic Industries Association/Telecommunications Industries Association (EIA/TIA)

EIA/TIA-568 Commercial Building Telecommunications Wiring Standard

EIA/TIA 569 Commercial Building Standard for Telecommunications Pathways and Spaces
6. Insulated Cable Engineers Association (ICEA) Publication:

S-80-576, SEP 83 Standard for Telecommunications Wire and Cable for Wiring of Premises

S-87-640-1992 Standard for Fiber Optic Outside Plant Communications Cable
7. National Fire Protection Association (NFPA) Publication:

70-1996 National Electrical Code
8. Underwriters Laboratories (UL) Publication:

Pub. Ref. No. 1 Electrical Construction Materials List
9. Bellcore

GR-20, "Generic Requirements for Optical Fiber and Optical Fiber Cable"

1.04 COORDINATION

- A. Coordinate and install work in accordance with the State of Connecticut Army National Guard Telecommunications personnel.
- B. Coordinate and install work in accordance with the Telephone Company (SNET - Southern New England Telephone).
- C. Coordinate with work provided under Section 16102 to assure raceway systems conform to the telecommunication wiring system requirements.

1.05 SYSTEM DESCRIPTION

- A. The telecommunications wiring system under this project shall be a specific cabling system that extends telephone, fiber optics and cable TV trunks from Building 806 to numerous buildings on site.

TELEPHONE SYSTEM

Base Bid

1. The telephone raceway system consists of an underground ductbank system utilizing Government-furnished duct and handholes and Contractor-furnished manholes, duct fittings and accessories for a complete underground raceway system between Building 806 and Building 301, as indicated on the drawings. Conduit risers shall be provided for connections to the new telephone service from SNET under a concurrent project and connection to the existing overhead system, including wiring and splicing of the new cable to the existing overhead cable.
2. Telephone wiring system consists of the installation, termination and testing of 600 pair and 200 pair trunk-type cables from Building 806 to telephone terminal cabinets; and connection to the existing telephone system in Building 301. Termination within Building 806 and 301 to new and existing telephone system wiring shall be provided under a concurrent contract. Testing of the new cables shall be provided under this contract.

Alternate No. 1

1. Replacement of overhead telephone cable and service drops to individual buildings, including pole attachments, splicing/termination and service drops. Service drops will include attachment to buildings, building protectors at the building service entrance and termination/cross-connection to existing building telephone systems.
2. Removal of all existing overhead cable shall be accomplished upon acceptance and operation of the new telephone system.

DATA SYSTEM

Base Bid

1. The Data System consists of installation of the Government-furnished riser optic cable between Building 806 and hubs, as indicated on the drawings. The system includes installation of the fiber optic cable within the underground Communications Ductbank System.
2. Service drops to various buildings shall be provided, terminated within the buildings, and acceptance tested.

Alternate No. 2

1. Installation of additional fiber optic cable, as indicated. Consists of installation of Government-furnished fiber optic cables and any additional fiber optic cable required. Under Alternate No. 2, the installation includes fiber optic cable to various buildings lashed to the existing and/or new telephone overhead wiring system.

June 07, 2002

Termination of fiber optic cable strands shall be provided at both ends of all installed cables, in order that cable acceptance testing can be made.

CABLE TV SYSTEM

Alternate No. 3

The Cable TV System consists of installation of coaxial cable for broadcast of television, video and other media. The system includes installation of wiring within the underground Communications Ductbank System and attached to the existing utility poles on the Base utilizing "figure 8" type coaxial cable. The system shall be designed to include all required amplifiers, splitters and other equipment for a complete operational system for connection to future head-end equipment provided by the Government. The cable system shall be connected from Building 800 to all buildings indicated on the drawings, including all service drops and termination equipment at each building.

- B. The exact route of cabling shall be as indicated on the plans. Any deviation of the routing must be approved by the Government.

1.05 SUBMITTALS

- A. Submit under Special Provisions of the Specifications and Section 01300.
- B. Proof of Compliance: Where materials or equipment are specified to conform to the standards or publications, and requirements of FCC, REA, ANSI, EIA/TIA, ICEA, NFPA or UL, the Contractor shall submit certificates attesting that the items furnished under this section of the specification conform to the specified requirements, if requested.
- C. The Contractor shall submit proof of experience, capability and competency for design, installation and testing the wiring system by including the following documentation on a response form:
 - 1. A list of prior contracts by customer name and address and dates supporting at least five (5) years experience in installing the wiring system of the types of cables involved.
 - 2. A summary of trained personnel, knowledge and experience necessary to install and test the new system, together with the management personnel and organization required to implement the work. Include a summary of types of splicing and testing equipment which will be used on this project.
 - 3. Proof of Compliance shall include, as a minimum, certification of completion of training in termination/splicing of fiber optic cables, both single mode and multi-mode, of the approved pigtail type and approved equipment.
- D. Shop drawings shall consist of design calculations, layout drawings of the complete wiring systems, a complete list of equipment and materials (bill of materials), manufacturer's description and technical literature, performance charts and curves, catalog cuts, and

June 07, 2002

installation instructions. Shop drawings shall also contain complete wiring and schematic diagrams, point-to-point termination schedules, and any other details required to demonstrate that the system has been coordinated and will properly function as a unit. Drawings shall show proposed layout of equipment and appurtenances, and equipment relationship to other parts of the work including clearance for maintenance and operations. Drawings created specifically for this project, wiring diagrams, and point-to-point schedules shall be produced on AutoCADD, Version 12, so they may be submitted as Project Record Drawings.

- E. Cable manufacturer's certificate shall be provided indicating equipment and wiring in compliance with transmission and reliability requirements.
- F. Manufacturer's recommendations shall be submitted where installation procedures, or any part thereof, are required to be in accordance with the recommendations of the manufacturer of the material being installed, printed copies of these recommendations shall be forwarded to the Government prior to installation. Installation of the item will not be allowed to proceed until the recommendations are received and approved.
- G. Submit for approval, before installation of any cable, cable pulling tension calculations for each cable run, along with cable manufacturers recommended maximum pull tensions for each cable type. Submit cable pulling results upon completion of the cable installation.
- H. Submit for approval cable installation plan indicating cable pull points and cable installation procedures.
- I. Spare parts, tools and test equipment data: The Contractor shall submit data lists of spare parts, tools and test equipment for each different item of materials and equipment specified needed for five years of operation of the system. The data shall include a complete list of parts and supplies, with current unit prices and source of supply. Spare parts for the equipment shall be recommended for all levels of repair and maintenance.
- J. Submit proposed testing plan and a copy of the test report for approval. Upon completion to tests, submit test reports for review no later than two weeks after tests are complete.

1.06 DELIVERY AND STORAGE

- A. All equipment delivered and shall be placed in storage with protection from the weather, humidity and temperature variation, dirt and dust, or other contaminants. The equipment shall be stored where designated by the Government, as well as within the completed Communications Room. The room shall be completed with all wall, ceiling and floor finishes in place before storage will be accepted there.
- B. Product will be packaged in a manner that will provide protection from damage during shipping, handling and storage.

1.07 PROJECT RECORD DOCUMENTS

- A. Submit record documents under Special Provisions of the Specifications and Section 16010.

- B. After installation, system drawings showing final configuration, including location, type, gage, and block and terminal assignment of wiring.
- C. Record Drawings shall be provided, on floppy disks, AutoCADD Version 12.

1.08 TESTING

- A. System acceptance test shall be performed in the presence of the Government and the Government's telephone vendor. Coordinate test procedures and give notice to the Government and other vendors two weeks in advance of test date.
- B. The Contractor shall submit a proposed detailed acceptance test plan for approval as part of the submittal package.
- C. Upon completion and testing of the installed system, test reports shall be submitted in booklet form showing all field tests performed to adjust each component and all field tests performed to prove compliance with the specified performance criteria.

1.09 OMISSION

- A. As it is not practical to enumerate in these specifications, all details of fittings and accessory equipment required for proper operation of the system herein described, it is understood that they will be supplied by the Contractor without extra compensation. The Contractor shall verify and confirm to the requirements of the Government's telephone equipment vendor.

PART 2 - PRODUCTS

2.01 FIBER OPTIC CABLE

- A. The 12 fiber count, fiber optic cable, shall be a multi-mode optic fiber. The fiber optic cables shall be a 12 fiber, single-mode. The fiber cable shall match the Government-furnished cable, Anixter No. 370-062-ALTOS-12.
- B. Cable Reels: Ship cable on reels in lengths sufficient for cable installations without splices with a minimum overage of 10 percent. Radius of the reel drum shall not be smaller than the minimum bend radius of the cable. Wind cable on the reel so that unwinding can be done without kinking the cable. Two meters of the cable at both ends of the cable shall be accessible for testing. Attach permanent label on each reel showing length, cable identification number, cable size, cable type, attenuation, bandwidth, and date of manufacture. Provide water resistant label and the indelible writing on the labels.
 - 1. Test 100 percent of the fibers with an optical time domain reflectometer (OTDR) at 850 nanometers and 1300 nanometers prior to shipment of the FO cable. Calibrate OTDR to show anomalies of 0.2 dB as a minimum. Submit photograph traces to the Government for approval.

2.02 OUTSIDE TELEPHONE CABLE

- A. The telephone cable shall be multiple pair, 24 AWG, REA Spec. PE89, rated direct burial, gopher shielded, gel filled, jacketed cable. The cable installed within a duct bank system shall be Essex Sealpic FSF or approved equal. Aerial cable shall be figure 8 type cable, Essex Sealpic, 84+M, or approved equal.
1. Conductors shall be solid, drawn, annealed bare copper.
 2. Insulation shall have an inner layer for foamed natural polyolefin with an outer layer of solid polyolefin with telephone industry color-coding.
 3. Cable core assembly shall be insulated conductors and twisted into pairs with varying lays (twist lengths) to minimize crosstalk and meet strict capacitance unbalance limits. Cables shall be assembled in sub-units.
 4. Shielding shall be a gopher-resistant 0.008" thick corrugated, polymer coated aluminum tape shield, and applied longitudinally with overlapped edges and flooded with compound.
 5. The outer jacket shall be black, low density, high molecular weight virgin polyethylene with a thickness of 0.100 inch.
 6. Footage markings are printed sequentially every two feet along the outer jacket to provide readily accurate records of cable usage and reel contents.
 7. The duct cable shall be flooded within the outer jacket with a petrolatum-polyethylene gel filling compound to eliminate possible moisture content, migration or ingress, thus providing improved electrical characteristic stability.
 8. The aerial cable shall be air core type cable.
- B. The telephone cable shall be shipped on reels of 1500 feet minimum, or maximum pulling length to install cable without splices.
- C. Cables shall be provided with factory installed pulling eyes.

2.03 TELEPHONE SPLICE CLOSURES

- A. Cable Splice Closure assembly consisting of a frame with clamps, a lift-off polyethylene cover and cable end plates. Closures shall be straight-through type and branch-type, as required, and shall be sized for the number of cable pairs as indicated. Closures shall be PSI Telecommunications Inc., Version 510, 3M, Performed Line Products, or approved equal.
- B. Ready Access Closures shall be reaccessible, weather-resistant closures for plastic insulated cable splices, terminations, service drops and loading coils. The closure mount on the cable's messenger strand shall accommodate up to four 6 pair (145 type) terminal blocks with an

inner shield bond and ground continuity system; and numbered drop wire entrances on bottom.

- C. The closures shall be black, weather grade polyethylene thermoplastic construction with stainless steel outer parts and aluminum brackets. The covers may be removed and replaced without disturbing cable entrance/sealed nozzle attachment assemblies. The closures shall be provided with branch nozzles as required and provisions for messenger/figure 8 cable ground bonding. The Ready Access Closures shall be as manufactured by Reliance or 3M.

2.04 PADMOUNTED CROSS-CONNECT TERMINAL CABINETS

- A. The terminal cabinets shall be constructed of 14 gage steel and comply with REA 1755I-100.
- B. The cabinet shall be equipped with a double set of hinged doors with closed-cell foam weatherstripping. Doors shall be locked and contain a marker as indicated.
- C. The cabinets shall be equipped with spool spindle bracket, mounting frames, binding post log, and jumpering instruction label and load coil mounting provisions.
- D. The cabinets shall be provided complete with cross-connect modules.
- E. The cabinets shall be sized for the terminations required. Provide 30 percent spare termination space. Cabinets shall be a minimum of 600 pair capacity.
- F. The terminal cabinet shall be as manufactured by 3M, Series 4300, Reliable (Reltec), or approved equal.

2.05 FIBER OPTIC CABLE TERMINATION

- A. Provide equipment required to terminate fiber optic wiring at all hub locations and all ends of fiber optic cables.
- B. Provide pigtails for all fiber cable terminations. All pigtails and connectors shall be the SC type. Multi-mode pigtails shall have 0.5 dB or less insert loss and 40 dB or more return loss. Pigtails shall meet Belcor 326 specifications. Pigtails shall be 10 feet in length and as manufactured by 3M, ADC or approved equal.

Each pigtail shall be provided with a serial number and factory test results, including insert loss and return loss. Pigtails will not be accepted without this information included on the submittal and packaging.

2.06 TELEPHONE TERMINATION FRAME EQUIPMENT

- A. Main Distribution terminations frames shall be 100-pair incremented, completely front-administered connector for use on central office main distributing frames. It accepts industry standard 5-pin protector modules.

The frames shall be factory stubbed 24-gauge cable in 10-ft. increments, starting at 30 feet. The stub is complete with a moisture dam and grounding harness.

A wire-wrap terminal field for cross-connection to central office equipment is on the right side of the connector. A slotted fanning strip is provided along this edge of the terminal field for running jumper wires. The connector is equipped with two standard 303-type 50-pair gold-plated test fields, one at the top and one at the bottom.

The main distribution frame termination shall be a Reltec Series R303A.

2.07 BUILDING SERVICE TERMINATION EQUIPMENT

- A. Building service entrance terminations shall be a wall or frame mountable enclosed terminal with 25 feet, 26 AWG cable, and either 110 connectors terminates the number of terminals and RJ21X female connectors as required. The enclosure shall be constructed of 26 gage steel, powder epoxy coated chassis and plastic components conforming to UL 497.

The building service entrance terminations shall be Circa Telecom 1880 Series or approved equal.

2.08 FIBER OPTIC CABLE TERMINATION EQUIPMENT

- A. Provide equipment required to terminate telecommunications wiring at all hub locations, patch panels and as indicated on the "Termination Equipment Schedule" for each building as specified herein.
- B. Fiber management racks shall be a 19-inch wide, 7-foot high standard fiber distribution frame, B-Line SB-556-084-XU; ADC Interbay Module part #E-501-L139 ADC, cable troughs, part #FL2-ACC011, ADC grounding kit FL2-ACC006 and other components listed or necessary for a complete rack assembly.
- C. Communications cabinets shall be a key-lockable, wall mount/swing-out cabinet with a pair of 19 EIA rails mounted within the cabinet. Cabinets shall be Great Lakes Case and Cabinet Inc. of a cabinet size as indicated below. Each cabinet shall include a fan assembly part #7217WS; two, 6-position power strips (surge-protected/rack mounted) part #7219-S; EIA channels part #WS36EIA, and other components listed or necessary for a complete cabinet rack assembly. Provide cabinet with lock keysets. All cabinets on the project shall be keyed alike.

Cabinet A - Part #GL 36 WS

Cabinet B - Part #GL 24 WS

- D. Provide pigtails and connectors for all fiber cable terminations. All pigtails and connectors shall be the SC type.
- E. Multimode connectors shall have 0.5 dB or less insert loss and 40 dB or more return loss. Multimode connectors shall be the hot melt type manufactured by 3M, Series 6300, or approved equal.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Verify that the complete duct bank system is ready for the installation of the cables.
- C. Verify that field measurements are as shown on Drawings.
- D. Beginning of installation means installer accepts existing conditions.

3.02 CABLE PULLING TENSIONS

- A. Cable pulling tensions shall not exceed the maximum pulling tensions recommended by the cable manufacturer.
- B. Submit pulling tensions calculations and cable pulling plans for approval before cable is installed.
- C. Cables shall be installed with an attached dynamometer.
- D. Provide cable pulling tension results after cables have been installed shall be submitted after cables have been installed.

3.03 AERIAL CABLE INSTALLATION

- A. The fiber optic cable shall be tested upon delivery to the site and before installation with an OTDR. Test results shall be compared, and if a discrepancy is found, it shall be brought to the attention of the Government for disposition. If test results are acceptable, then installation of cable may proceed.
- B. Contractor shall install cable in conformance with manufacturer's recommendations. Contractor shall not exceed the telecommunications cable manufacturer's minimum bending radius. General guidelines for minimum bending radius is 15 times the cable diameter for permanent training and 20 times the cable diameter plus 2 inches during installation or under tension and 10 times during static (storage) conditions.
- C. Care must be taken to avoid cable damage during handling and placing. Fiber optic cable is sensitive to excessive pulling, bending, and crush forces. Any such damage may alter the cable's characteristics to the extent that the cable section may have to be replaced. To ensure all specifications are met, consult the specific cable specification sheet for the cable being installed.

As a general guideline for installing fiber optic cable, the maximum pulling tension shall be 600 lbs. All cables up to 0.9 in nominal cable diameter can be installed using a 20 in diameter wheel. Use a bend radius of 20 times the cable diameter to avoid wrinkling.

- D. Before the installation begins, ensure safe conditions within and around manholes and equipment. Apply all standard safety precautions required. Carefully inspect the cable reels for imperfections such as nails and broken flanges which might cause damage to the cable as it is unreeled.
- E. Precautions should be taken to protect reeled cable from vandals or other sources of possible damage while unattended. The sections of cable intended for duct installation are produced to meet specific length requirements. Any damage to the cable sections may require replacement of the entire section.
- F. Whenever unreeled cable is placed on the pavement or surface above a manhole, provide barricades or other means of preventing vehicular or pedestrian traffic through the area. Protect the cable from damage due to abrasion. Do not drag the cable over obstructions. Provide hold-down blocks where obstructions are present.
- G. Fiber optic cables will be installed parallel to and lashed to new and existing telephone cables. Do not over-tension the cable during installation. Install cables in conformance with cable manufacturer's recommendations and procedures.
- H. When placing aerial cable, all precautions and safety requirements shall be followed. When required, use of warning signs and traffic warning cones shall clearly define the work area to safely channel the traffic. On streets or highways, always place the cable in the same direction as the traffic flow and use flagmen to control traffic. Do not place ladders, cable coils, or other equipment on or against wires.
- I. Do not allow the cable to twist as it is pulled through travelers or sheaves. If continuous twist in a constant direction is observed, stop the installation immediately, ease off the tension, and readjust to traveler. Due to the light weight of aerial fiber optic cable in relation to most sheaves, and the relative low stringing tensions used during installations, the traveler will require support at the base to help prevent the cable from riding out of the traveler or prevent excessive twisting during installation.
- J. Do not sag/tension the cable around heavy angles. Always sag/tension the cable from dead-end segments to dead-end segment.
- K. The Contractor is responsible for selection of attachment position of the aerial cable at all poles and buildings.
- L. On figure 8 type cables, perform spiraling of the wire within 24 hours of the tensioning operation. Perform spiraling operations at alternate poles with the approximate length of the spiral being 15 feet. Do not remove insulation from support members, except at bonding and grounding points and at points where ends of support members are terminated in splicing and dead-end devices. Ground support wire at poles to the pole ground. When tensioning strand, loosen cable suspension clamps enough to allow free movement of the strand. Place

June 07, 2002

suspension strand on the road side of the pole line. In tangent construction, point the lip of the suspension strand clamp toward the pole. At angles in the line, point the suspension strand clamp lip away from the load. In level construction, place the suspension strand clamp in such a manner that it will hold the strand below the through-bolt. At points where there is an up-pull on the strand, place clamp so that it will support strand above the through-bolt. Make suspension strand electrically continuous throughout its entire length, bond to other bare cables suspension strands and connect to pole ground at each pole.

- M. Keep cable ends sealed at all times using cable end caps. Take cable from reel only as it is placed. During placing operations, do not bend cables in a radius less than 10 times the outside diameter of cable. Place temporary supports sufficiently close together and properly tension the cable where necessary to prevent excessive bending. In those instances where spiraling of cabling is involved, accomplish mounting of enclosures for purposes of loading, splicing, and distribution after the spiraling operation has been completed.
- N. The Contractor is responsible to prevent dangerous oscillations of installed cable.
- O. The Contractor is responsible to maintain the code separation and clearance requirements at the attachment points of the cable.

3.04 LASHING WIRE

- A. Wind wire tightly around both communication cable and messenger cable by machine methods. Provide a minimum of one turn per 14 linear inches and not less than the number of turns per linear foot recommended by the cable manufacturer for the distance between cable support points, and the combined ice and wind loading and extreme wind loading shown or normally encountered for the installed location. Provide lashing clamps at poles and splices.

3.05 STRESS LOOPS

- A. Provide loops at points of connection and at poles to prevent damage from thermal stress and wind loading. Protect cable from chafing and physical damage with spiral cut tubing and PVC tape, or plastic sleeves.

3.06 SERVICE LOOPS

- A. Provide service loops of not less than three meters in length at each end of the cable. Provide weatherproof enclosure.

3.07 SPLICES

- A. Splices shall be within 3 feet of a pole and placed inside a watertight enclosure. Provide drip loops at cable entrance to the enclosure. Place lashing clamps within 12 inches of the enclosure.

June 07, 2002

3.08 UNDERGROUND TELEPHONE CABLE INSTALLATION

- A. Contractor shall install cable in conformance with manufacturer's recommendations. Contractor shall not exceed the telecommunications cable manufacturer's minimum bending radius. Provide pulling tension calculations and cable installation procedures for review before cable installation.
- B. Care must be taken to avoid cable damage during handling and placing. Any such damage may alter the cable's characteristics to the extent that the cable section may have to be replaced. To ensure all specifications are met, consult the specific cable specification sheet for the cable you are installing.
- C. Before the installation begins, ensure safe conditions within and around manholes and equipment. Apply all standard safety precautions required. Carefully inspect the cable reels for imperfections such as nails and broken flanges which might cause damage to the cable as it is unreeled.
- D. Precautions should be taken to protect reeled cable from vandals or other sources of possible damage while unattended. The sections of cable intended for duct installation are produced to meet specific length requirements. Any damage to the cable sections may require replacement of the entire section.
- E. Whenever unreeled cable is placed on the pavement or surface above a manhole, provide barricades or other means of preventing vehicular or pedestrian traffic through the area.
- F. Cable shall be installed without splices. If the cable is damaged during installation, the cable may be spliced only if approved by the Government. If approval is not granted, the Contractor shall provide entire length of new cable. If splice is approved, the splice shall be made in an approved manner and provided with an approved handhole or manhole. Record contract documents shall indicate exact location of splice. Upon completion of the splice, the entire length of cable will be tested for conformance with the cable performance specification. If cable does not meet required cable performance, the Contractor shall replace the entire length of cable.
- G. Cable ends shall not be left unterminated (unspliced). All cables shall be provided with termination at each end in accordance with specifications.
- H. Any damage to the telecommunications cables, or other existing telecommunications cable shall be brought to the attention of the Contracting Officer.
- I. Cable shall be sealed in an approved manner as detailed when it enters into buildings.
- J. Upon completion of cable installation, tests shall be made to determine condition of the cable in a manner as described in the Contractor's Test Plan.

June 07, 2002

3.09 UNDERGROUND FIBER OPTIC CABLE INSTALLATION

- A. The cable shall be tested upon delivery to the site and before installation with an OTDR. Test results shall be compared, and if a discrepancy is found, it shall be brought to the attention of the Government for disposition. If test results are acceptable, then installation of cable may proceed.
- B. Contractor shall install cable in conformance with manufacturer's recommendations. Contractor shall not exceed the telecommunications cable manufacturer's minimum bending radius. General guidelines for minimum bending radius is 15 times the cable diameter for permanent training and 20 times the cable diameter during installation or under tension.
- C. Care must be taken to avoid cable damage during handling and placing. Fiber optic cable is sensitive to excessive pulling, bending, and crush forces. Any such damage may alter the cable's characteristics to the extent that the cable section may have to be replaced. To ensure all specifications are met, consult the specific cable specification sheet for the cable you are installing.

As a general guideline for installing fiber optic cable, the maximum pulling tension shall be 600 lbs. All cables up to 0.9 in nominal cable diameter can be installed using a 20 in diameter wheel. Use a bend radius of 20 times the cable diameter to avoid wrinkling.

- D. Before the installation begins, ensure safe conditions within and around manholes and equipment. Apply all standard safety precautions required. Carefully inspect the cable reels for imperfections such as nails and broken flanges which might cause damage to the cable as it is unreeled.
- E. Precautions should be taken to protect reeled cable from vandals or other sources of possible damage while unattended. The sections of cable intended for duct installation are produced to meet specific length requirements. Any damage to the cable sections may require replacement of the entire section.
- F. Whenever unreeled cable is placed on the pavement or surface above a manhole, provide barricades or other means of preventing vehicular or pedestrian traffic through the area.
- G. The "figure-eight" configuration should be used to prevent kinking or twisting when the cable must be unreeled or backfed. Fiber optic cable should not be coiled in a continuous direction except for lengths 100 ft or less. The preferred size for the "figure-eight" is about 15 ft in length, with each loop 5 ft to 8 ft in diameter. Traffic cones spaced 7-8 feet apart are useful as guides during "figure-eighting." When "figure-eighting" long lengths of cable, care should be taken to relieve pressure on the cable at the crossover of the eight. This can be done by placing cardboard shims at the crossover or by forming a second "figure-eight."
- H. Multiple cables may be pulled simultaneously into one innerduct if they are installed at the same time.
- I. Pull-line must be installed into the duct system. Lubrication of the pull-line is necessary for ease of installation. Cable lubricant is recommended for all fiber optic cable pulls. Cable

June 07, 2002

lubricants must be compatible with the fiber optic cable's outer sheath. Lubricant should be applied according to the manufacturer's recommendations. Additional lubricant should be added before bends and known severe offsets and sections with elevation changes.

- J. Locate the cable reels at the appropriate points of the route. Remove reel lagging and retrieve the cable data sheets from each reel for as-built records. Inspect the reels and equipment on which they are mounted for any bolts, nails or other protrusions that could damage the cable as it is paid off. Ensure that the reel trailer or jack stands are stable, and that the reel may turn freely without binding. The reel must be level to allow proper pay off of cable.

Align the reel at the feed hole so that the cable can be routed from the top of the reel into the duct bank in as straight a path as possible. Use bending shoes, sheaves, secured sections of innerduct, or other devices to control cable feed into the duct bank.

If not previously installed, attach the pulling grip to the cable, and attach the grip to a swivel. The swivel should be securely fastened to the pull-line. See the pull-line manufacturer's recommendations for appropriate knots.

A warning marker (colored tape or similar material) must be attached to the pull line several feet in front of the pulling grip to alert observers at manholes that the cable is approaching.

Apply cable lubricant as required.

Verify that communication lines are functional and crews are in place at feed, pull, and intermediate manholes.

Start the pull at a slow speed, passing the pull line and cable over and around the capstans, sheaves, and other devices required to maintain the minimum bend radius. Begin tension monitoring with a calibrated device as soon as tension is applied to the cable. If necessary, aid the cable feed by turning the reel by hand. Ensure that the cable is fed only as fast as the pull-line is moving. Back tension on the reel will prevent too much cable being fed off.

Once the cable has moved a minimum of five feet into the innerduct, accelerate the pull smoothly to its intended speed.

Continue the pull at a steady rate. If it is necessary to stop the pull at any point, the winch operator should stop the pull but NOT release the tension unless instructed to do so. Pulls can be easily resumed if tension is maintained on the pull-line and cable.

The cable should be visually observed during the following situations:

1. When it passes through any intermediate manhole in which innerduct continuity is broken.
2. Where use of a radius-maintaining device is required due to a bend or offset of entrance and exit ducts.
3. At intermediate-assist winches.

June 07, 2002

Ensure that the bend radius is maintained, and that the cable is properly routed through the sheaves, capstans, bending shoes, etc. Stop the pull if the cable is misrouted, and correct the problem before resuming.

When the cable end reaches a backfeed point, put the cable out of the hole using a setup similar to that at the feed hole to maintain bend radius. After passing around the winch, the cable slack should be "figure-eighted" in an area where it will not be subject to damage by personnel or traffic.

Pulls which have a large number of intermediate manholes will require a large quantity of cable slack. This slack must be pulled from the two end points and backfed to provide racking slack.

At splice points, pull sufficient slack (typically 40 ft of slack) from the lip of the manhole to reach the intended splicing location, plus enough slack to permit closure preparation and splicing.

Once the cable is pulled into place and appropriate slack is available at splice or termination points begin securing cable to cable racks on the manhole walls. Begin racking at the center manhole and proceed to the end manholes. Maintain the cable's bend radius.

Store coiled splicing slack in the splicing points so that it is not likely to be damaged during later work.

Each splice point should include a minimum of 50 ft. of cable on both cable ends to allow for future splicing/terminations.

At hand holes, cable slack should be placed horizontally in the hole.

- K. Each Fiber optic cable must have an excess slack of 1 00 feet within the run. This excess slack can provide added cable for restorations or reconfigurations without digging up large parts of the cable system.
- L. The contractor is responsible to indicate on as-built drawings where the excess slack for each cable remains.
- M. Cable shall be installed without splices. If the cable is damaged during installation, the cable may be spliced only if approved by the Government. If approval is not granted, the Contractor shall provide entire length of new cable. If splice is approved, the splice shall be made in an approved manner and provided with an approved handhole or manhole. Record contract documents shall indicate exact location of splice. Upon completion of the splice, the entire length of cable will be tested for conformance with the cable performance specification. If cable does not meet required cable performance, the Contractor shall replace the entire length of cable.
- N. Cable ends shall not be left unterminated (unspliced). All cables shall be provided with termination at each end in accordance with specifications.

- O. Any damage to the telecommunications cables, or other existing telecommunications cable shall be brought to the attention of the Government.
- P. Cable shall be sealed in an approved manner as detailed when it enters into buildings.
- Q. Upon completion of cable installation, tests shall be made to determine condition of the cable in a manner as described in the Contractor's Test Plan.

3.10 ACCEPTANCE TESTS

- A. Upon completion of the system, test all cables, to assure the system is operating at maximum capability.
- B. After the system is installed and tested, notify the Government to arrange for an acceptance test at a mutually agreed upon time of all parties.
- C. All equipment, personnel and supervision necessary to conduct the field test shall be provided by the Contractor.
- D. Test Plans: The Contractor shall develop the Test Plans defining all the tests required to ensure that the system meets technical, operational, and performance specifications. The Test Plans shall define milestones for each test, equipment, personnel, facilities, and supplies required. The Test Plans shall identify the capabilities and functions to be tested.
- E. Test Procedures and Reports: The test procedures shall be developed from the test plan. The procedures shall consist of detailed instructions for the best setup, execution, and evaluation of the tests. The procedures for interior wiring shall consist of visual inspection, basic system operation, trunk call-through, station feature operations, and maintenance and administrative operations. Visual operations can begin at any period during installation and are used to list all newly installed equipment. Test procedures for exterior wiring shall conform to recommendations of the cable manufacturer. Reports shall be delivered to the Government within 7 days after completion of each test.

3.11 TELEPHONE CABLE TEST PROCEDURES

- A. Provide the Government 10 working days notice prior to each test. Provide labor, equipment and incidentals required for testing. Correct defective material and workmanship disclosed as the results of the tests. Furnish a signed copy of the test results to the Government within 3 working days after the tests for each segment of construction are completed. Perform testing as construction progresses and do not wait until all construction is complete before starting field tests.
- B. Perform the following tests on cable at the job site before it is removed from the cable reel. For cables with factory installed pulling eyes, these tests shall be performed at the factory and certified test results shall accompany the cable.
 - 1. Perform DC-loop resistance on at least 25 percent of the pairs within a cable to determine if cable capacitance is within the limits specified.

June 07, 2002

2. Perform DC-loop resistance on at least 25 percent of the pairs within a cable to determine if DC-loop resistance is within the manufacturer's calculated resistance.
- C. Submit results of pre-installation tests to the Government at least 5 working days before installation is to start. Results shall indicate reel number of the cable, manufacturer, size of cable, pairs tested, and recorded readings. When pre-installation tests indicate that cable does not meet specifications, remove cable from the job site.
- D. All or part of the following acceptance tests may be required by the Contracting Officer: Shield continuity, conductor continuity, conductor insulation resistance, DC-loop resistance, resistance unbalance, insertion loss, frequency response, line noise measurement, subscriber loop measurements, structural return loss (one or two man), cable carrier insertion loss, and cable carrier frequency response.

3.13 FIBER OPTIC TEST PROCEDURES

- A. Six basic test procedures should be performed to test fiber during preinstallation, installation and acceptance. They are Distance test, Fiber loss test, Event Loss test, Link Loss, Return Loss, and Link-Return Loss. A preinstallation test should be performed when fiber optic cable is obtained from the Contractor. The test should check for correct cable distance, confirms manufacturer's specifications and checks for material anomalies. The contractor must substantiate and document that before installation the fiber is free from defects.
- B. Installation and acceptance testing should involve all six tests. Link loss and link distance measurements should be made first. If link-loss levels are acceptable, then link return-loss and event return-loss should be performed.
- C. An OTDR test shall be used to determine the adequacy of the cable installation. An OTDR has to detect events on the fiber, such as discontinuities, microbending and improper splices. There are two types of events reflective and non-reflective. These events should be marked by OTDR, and the data for each event must be retrievable. Each fiber within the system must be tested and measured in both directions. A reference length of fiber, 1 km minimum, used as a delay line, shall be placed before new end connectors and after the far end patch panel connectors for inspection of connector signature. When measuring reflectance values on individual events, adjust OTDR pulse width to shortest possible value while maintaining a discernible image on the OTDR display. Test documentation has to be stored in a floppy disk and printed as a hard copy with all test results labeled. The Contractor is responsible to provide the Government necessary software to view OTDR test results if non-standard documentation is used.

All testing is to be done through connectors. Any fiber that fails testing must have appropriate corrective action taken to rectify the situation.

The optical power loss for two mate connectors should not be more than 0.75 dB.

The optical power loss for each individual splice point should not be more than 0.2 dB.

- D. The system return loss should be less than or equal to -40dB.

The final step in accepting cable installation will be a thorough inspection of the entire route from start to finish. The "as-built" drawings must be submitted to the Government one week prior final inspection. The drawings will be examined by engineering personnel and involved parties for conformance to the engineering plans, codes, regulations, and general accuracy.

The record drawings shall be returned to the Government on completion of the work and are subject to the approval of the Government.

The as-built drawings shall also be submitted in the following formats:

1. Three copies of master on "E" size paper.
2. Three copies of master on 11 " x 17" size paper.
3. One 3.5" floppy disk media, formatted using MS-DOS, containing all drawings generated using Computer Aided Drafting (CAD). CAD drawing files shall be saved using the "DXF" universal file format.

3.14 LABELING

- A. A labeling plan must be submitted to and approved by Government prior to installation, and the completed labeling must meet the approval of the Government. EIA 606 standards are to be met.

1. All cable must be clearly labeled by the Contractor at the termination points location and within all manholes. (Brady marker or similar)
2. All SC connectors connected to patch panels must also be labeled on patch panel.

3.15 SPARES/ACCESSORIES

- A. One additional reel of fiber optic cable, minimum of 200 ft., shall be provided as a maintenance spare.
- B. Twenty, single mode mechanical splices (maximum attenuation 0.2 dB) shall be provided as maintenance spares.

END OF SECTION 16740

SECTION 16800

SECURITY SYSTEMS

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. This section includes the furnishing, installation, connecting and testing of security system devices required to form a complete system as shown on the drawings and specified herein.
- B. The security system shall consist of the following major components:
 - 1. Closed Circuit Television Equipment and Accessories.
 - 2. Access Control Equipment.
 - 3. Intercom Station.
- C. Security system equipment specifications reference specific manufacturers to establish performance requirements. Other supplies may be provided with approval of Government provided they are in strict compliance with these specifications. Security system provided shall be AVS or approved equal.

1.02 SUBMITTAL REQUIREMENTS

- A. Riser diagrams showing each component of the system, it's operation and intersystem dependability shall be provided. All drawings shall be created on AutoCAD 14 or newer version.
- B. A detailed description of system operations.
- C. A paragraph-by-paragraph description of how the equipment submitted conforms to the specifications.
- D. Data sheets defining each system component including manufacturer and model number shall be provided.
- E. A list providing a minimum of three existing installations that have been installed by the bidder, utilizing a similar system of that specified, shall be provided with the proposal/bid. The list shall include the names and telephone numbers of people may call for references. Builders shall include the names, addresses, telephone numbers and email addresses.
- F. Bidders shall provide proof of factory trained certification on all specified equipment.

1.03 MINIMUM BIDDER REQUIREMENTS

Minimum of 5 years in business and installing similar types systems.

One-year warranty on parts and labor

Lifetime workmanship warranty

Minimum liability insurance in the amount of \$5,000,000.00

Free loaner equipment

Available 24-Hour Service Response

Free Customer Training

Factory Trained Technicians

Hold all required Licenses to install in the state of Connecticut

1.04 WARRANTY AND SERVICE REQUIREMENTS

- A. Warranty and service of all equipment being furnished is of prime importance to the Government. The contractor shall demonstrate the ability to promptly provide any and all types of service required by the equipment being installed. Warranty and Service shall include but not be limited to the following:
- System software programming
 - Application support
 - Repair or replacement of defective or malfunctioning equipment
 - Installation
 - Cabling
 - Workmanship
- B. The bidder shall provide a copy of its standard maintenance and service agreement and state exactly what it includes and excludes. This shall be submitted with the bid/proposal.
- C. The system shall be covered under warranty for a minimum of one year. The warranty shall include but not be limited to parts, time, labor and travel, for all equipment installed.
- D. The installation itself shall be covered under warranty for the life of the system. Any and all additional costs to provide this coverage shall be included in the proposal. All equipment will require a minimum one-year warranty.
- E. An optional three-year service agreement shall be provided as part of the bid package.

- F. The system shall be provided with a one-year software agreement. This agreement shall cover all software support and new software upgrades. The bidder shall also provide a separate proposal to renew the software agreement, once the first year expires.
- G. All equipment and materials used shall be standard components, regularly manufactured, regularly utilized in the manufacturer's system.
- H. All systems and components shall have been thoroughly tested and proven in actual use.
- I. All systems and components shall be provided with the availability of a toll free (U.S. and Canada only) 24 hour, technical assistance program (TAP) from the manufacturer. The TAP shall allow for immediate technical assistance for either the dealer/installer or the end user at no charge.
- J. All systems and components shall be provided with a one-day turn around, repair express and 24 hour parts replacement. The repair and parts express shall be guaranteed by the manufacturer on warranty and non-warranty items.

PART 2 – CLOSED CIRCUIT TELEVISION EQUIPMENT

2.01 VIDEO MATRIX

- A. Description: Modular microprocessor-based video matrix switcher/controller for up to 168 video inputs and 24 video outputs.
- B. Performance Specifications: The microprocessor-based matrix switcher/controller system must provide full integration of video switching and control of camera sites having fixed or variable-speed pan/tilts or domes. The integration must be automatic where selection of camera site control must follow video switching.
- C. System Architecture: The matrix switcher/controller system shall incorporate an industry standard real-time operating system running on a latest generation 32-bit RISC-based microprocessor.

All configuration and user programmed information must be held in non-volatile FLASH memory to prevent mechanical problems associated with continuous access of information from floppy discs and the like. Retention of all user-programmed information must not be affected by loss of power and the system shall “reboot” automatically and begin functioning normally upon restoration of power. Start-up shall not require any operator intervention.

This matrix system must be capable of receiving up to 168 independent video signals and routing these signals to any or all of the video outputs. This function must be done without degradation to the quality of the video signal.

The matrix system must be completely modular in design, thus providing easy expansion and servicing. Plug-and-play system modules must be installable with power applied and

June 07, 2002

automatically configure themselves for proper operation. Video input modules shall not require the setting of links, jumpers or DIP switches. Hot swapping of all modules shall allow for replacement and expansion of system modules without the need to remove power to any part of the system, ensuring continuous operation in mission critical installations.

The system shall incorporate a mid-plane architecture for connection of system modules. All system modules incorporating active electronics shall be easily removable directly through the front without removal of power or disturbance to system wiring.

A color-coded label for easier identification shall identify all system modules.

A minimum of 168 video inputs and 12 video outputs, all with on-screen text capability, must be supported in a single 8-3/4 inch high matrix switching bay occupying 5U rack space or less.

A minimum of 168 video inputs and 24 video outputs, all with on-screen text capability, must be supported in a 17-1/2 inch or 10U rack space or less. All bay-to-bay data and video interconnect cables must be factory tested and supplied with the system.

The complete video processing from video input to video output shall provide a signal gain of unity (± 1.0 dB) and a differential phase of 0.5° or less. All outputs must be AC coupled allowing no DC voltage onto the video output signal. The video signal tilt cannot exceed 2.0%.

The circuitry responsible for routing the video signals must have a minimum bandwidth of 20 MHz at a signal-to-noise ratio of -60 dB. Using 3.58 MHz as the reference, the circuitry responsible for routing the video signals must have crosstalk separation of -55 dB between adjacent video channels and separation at the video inputs of -70 dB.

All control parameters shall be provided—but not limited to—the system keyboards. To limit user access to the matrix system, password log-on protection for up to 64 users shall be provided. To increase user flexibility or restriction, eight programmable levels of priority must be provided for each user's password.

All programming functions shall be protected from unauthorized use via a key-operated switch or system lock password. For programming purposes, user friendly, on-screen menus must be displayed through a system status output.

For programming with an external computer, a Windows 95 or NT 4.0 software interface must be supplied. The software must provide for simplified system setup, archiving and retrieval of system data, and uploading and downloading of system setups to the system. System performance shall not be affected during periods of down/up loads. Configuration information must be dynamically updated and shall not require the system to be rebooted.

The set up software must be user friendly, intuitive and graphical, incorporating symbols and icons.

D. On-Screen Monitor Display

Each system output must provide field programmable on-screen display of video input number, video input title or preset title, alarm title, time, date, and monitor status. Each on-screen display must provide horizontal and vertical positioning and brightness control ranging from white to black that is adjustable from any system keyboard. All characters

displayed must be white with black outline to enhance readability. Alarm titles must be displayed on a color background for further identification.

Each system output must provide the ability to independently turn off video input number and monitor status, title display or time/date information. The four digit video input number must be field programmable regardless of the physical input to the matrix system (pseudo number). The video input title must consist of a minimum of 16 alphanumeric characters.

Field selectable formats of the date display shall be MM/DD/YY, DD/MM/YY or YY/MM/DD.

E. Communications Ports

The matrix switcher/controller shall provide eight RS-232 communication ports for external connection to computers, printers, alarm interface units and additional system control keyboards.

Each of the ports must provide field programmable baud rates of 1200, 2400, 4800, 9600 baud, 19.2 and 38.4 Kbaud. With optional port expanders, each of the eight ports must have the ability to expand to four ports each, thus providing a total of 32 ports.

The matrix switching system shall provide one parallel port for connecting a printer.

F. Alarms

The matrix switcher/controller shall support a minimum of 1024 external alarm inputs.

Upon receiving an alarm, the matrix switcher/controller shall also provide field programmable alarm display modes. For single monitor alarm display, the selection of alarm modes shall be "auto SEQUENCE mode" or "auto HOLD mode." When multi-monitor alarm displays are required, the selection of alarm modes shall be "SEQUENCE and DISPLAY," "BLOCK SEQUENCE" and "BLOCK HOLD." Regardless of the selected display mode, a system operator shall have the ability to hold and sequence alarms by using conventional monitor tour controls. Any and all system outputs must be individually programmable for any display method.

A minimum of five user-definable alarm clearance methods must be provided. The five methods shall be ACKNOWLEDGE (manually acknowledged via a system keyboard), INSTANT AUTOCLEAR (alarm clears when alarm input clears or when manually acknowledged from a system keyboard), INSTANT AUTOCLEAR/NO MANUAL ACKNOWLEDGE (alarm clears when alarm input clears only), AUTOCLEAR (alarm clears approximately 20 seconds after alarm input clears or when manually acknowledged from a system keyboard) and AUTOCLEAR/NO MANUAL ACKNOWLEDGE (alarm clears approximately 20 seconds after alarm input clears only).

During alarm response, the matrix switching system must provide programming for automatic call-up of a camera preset, turn on or off an auxiliary, and provide on-screen text on a color background indicating the occurrence of an alarm.

The matrix switcher/controller system must also provide alarm occurrence and removal information via the parallel printer output, any designated RS-232 port, and/or the system status output. The minimum information supplied on the port shall be alarm time and date, alarm contact, and video input switched.

June 07, 2002

The matrix switching system shall support up to 10 alarm contact tables. Each table shall support the assignment of video input numbers (with Preset, Pattern, and/or auxiliary action) to alarm contact numbers (ACN). Each contact table may be called by any of the 35 event timers to activate/deactivate alarm inputs according to time of day and day of week.

G. Tours

The matrix switching system shall support an individual monitor tour (sequence) for each and every video output. The monitor tour shall consist of up to 64 entries. Each entry may have an associated video input and dwell time.

The matrix switching system shall also support up to 64 universal tours. Each universal tour shall consist of up to 64 entries. Each entry may have an associated video input, Preset, Pattern, and/or auxiliary action. Video inputs may be included in the same tour multiple times. Alternatively, a salvo or tour can be substituted for the video input number to allow sequences of more than 64 entries. The operator must be able to manually step through the tour, stop the tour or run the tour forward or in reverse.

All tour information will reside in non-volatile memory. Tours may also be called automatically via a programmable seven-day timer. A minimum of thirty-five user-programmable time slots, independently programmable for each of seven days, must be provided.

H. Salvos

The matrix switcher/controller system must be capable of switching up to 16 video inputs to 16 video outputs simultaneously. Up to of 64 groups of 16 inputs (with Preset and auxiliary action) shall be provided for programming into a universal tour sequence. Operation of a salvo sequence must have all the features of a standard tour.

I. Partitioning

The matrix switcher/controller system must provide for system partitioning to prevent unauthorized access.

Minimum parameters for partitioning shall be keyboard-to-monitor access, camera-to-monitor access, keyboard-to-camera access and keyboard-to-camera control access.

J. Camera Site Control

The matrix switcher/controller system shall provide a minimum of one 125 kbps high speed data port for sending all video switching and camera site control code to optional peripheral equipment. In addition, an optional multi-protocol control code module must be available for output of camera site control code. The choice of protocol shall consist of AD Manchester code, SEC RS-422 and SensorNet.

The AD Manchester code must provide control data required for camera sites and shall be transmitted over a single, 18AWG shielded-twisted pair (STP) of wires for a minimum of 1500 Meters (5000 feet). The maximum number of devices that can be "daisy-chained" within the 1500 Meters (5000 feet) shall be three.

The SEC RS-422 code must provide control data required for camera sites and shall be transmitted over two 22AWG shielded-twisted pair of wires (STP) for a maximum of 1000

Meters (3000 feet). The maximum number of devices that can be "daisy-chained" within the 1000 Meters (3000 feet) shall be ten.

The SensorNet code must provide control data required for camera sites and shall be transmitted over a single 22AWG unshielded-twisted pair (UTP) of wires for a maximum of 1000 Meters (3000 feet). The maximum number of devices that can be connected within a network link within the 1000 Meters (3000 feet) shall be thirty-two. Network links can consist of a daisy chain, a backbone, or a star topology.

K. Video Loss

The matrix switcher/controller system shall be capable of sensing all video inputs for video loss detection. This feature must be standard.

This feature must be integral to the video switching bays, and must detect the loss of video sync and at least three different degrees of partial video loss for each input, independently. All detection of video loss must be logged through the system's parallel printer port, and any designated RS-232 port and/or the system status output. In the event of video loss, the video will automatically be turned to a blue raster to indicate the loss.

L. System Printer

The system shall have a parallel printer port for the purpose of quickly providing hard-copy printouts of all system activities. Alternatively, any one of the system's eight RS-232 ports must also be able to be configured as a serial printer port.

M. Power

The matrix switcher/controller system must be capable of operating to full specification from a supply voltage between 90-264VAC at a frequency of 47 to 63 Hz. The power consumption cannot exceed 180 watts per bay with all functions operating. The system shall support a redundant power supply via a backup DC power supply input.

N. Languages / Character Sets Supported

The matrix switcher/controller system shall support menus and on-screen text displayed in the following languages: English, Spanish, French, German, and Portuguese.

N. Diagnostics

The front of each module shall have a Light Emitting Diode (LED) that provides a rapid indication of the module's health. Under normal conditions, the status LED's shall provide a synchronous beating output. A see-through window in the front-panel enables the LEDs on all modules to be viewed without the front-panel having to be removed.

The matrix switcher/controller system shall provide a color bar test pattern to ensure consistent display attributes for all monitors installed.

The microprocessor-based matrix switcher/controller system shall be an American Dynamics AD168 or equivalent.

O. Minimum Performance Specifications

The matrix switcher/controller system shall meet the following minimum operating requirements:

June 07, 2002

General

The switcher shall be a microprocessor based integrated Closed Circuit Television (CCTV) full cross-point video matrix switching and control system. The system shall incorporate an industry standard real-time operating system running on a 32-bit RISC-based microprocessor and permit remote control operation of motorized pan/tilts, motorized lens devices and domes.

Video Matrix

Video Standards: EIA RS-170, NTSC, CCIR and PAL compatible

Video Input: 12 to 168, BNC, composite video (0.5 to 2.0 Vp-p)

Video Output: 6 to 24, BNC, composite video (1 Vp-p)

Video Switching

Switching Reference: Vertical interval switching or external sync (selectable)

Vertical Interval Switching: Phase adjustable up to 180° from the phase of AC power supplied to the switching bay

External Input: Vertical synchronization or composite video, BNC, 1.0- 4.0 Vp-p

Switching Speed: < 20 milliseconds (typical)

Video Specifications

Bandwidth: 20 MHz

Frequency Response: ± 1 dB to 6 MHz

Signal-to-Noise: -60 dB

Crosstalk

Adjacent Channel: -55 dB @ 3.58 MHz

Input to Input: -70 dB @ 3.58 MHz

Differential Phase: $\leq 0.5^\circ$

Differential Gain: $\leq 1.5\%$

Tilt: $\leq 2.0\%$

Gain: Unity ± 1 dB

Return Loss (Input/Output): ≥ 40 dB

Differential Delay: $\pm 1.0^\circ$

June 07, 2002

Control Inputs

RS-232 Ports:

Minimum of eight 8-pin modular RJ-45 data ports

Baud Rates: 1200, 2400, 4800, 9600 baud, 19.2 and 38.4 Kbaud Expandable to 32 ports

PC System Software:..... Windows 95 and NT 4.0 simplified system setup, archiving and retrieval of system data, and uploading and downloading of setup information to the system

Site Control

Control of fixed or variable speed pan/tilts, motorized zoom lenses, domes, auxiliary relay outputs, and preset program and recall of suitably equipped devices.

Management Control

System Passwords: 64 user programmable

Priority: Eight levels—access to system features may be restricted based on priority level

Partitioning: Keyboard-to-monitor access

Keyboard-to-camera access

Keyboard-to-camera control access

Camera-to-monitor access

Tours

Individual Monitor Tours:..... One tour per system output, 64 entries per tour

Individual Camera Dwell: 1 to 60 seconds (adjustable)

Universal System Tours: 64 universal tours, 64 entries per tour.
Selectable to any system output, cascable for sequences greater than 64 cameras

Individual Camera Dwell: 1 to 60 seconds (adjustable)

Salvo/Zone Tours: Multiple video inputs called to multiple contiguous monitors simultaneously

64 individual camera groups consisting of 16 cameras each

Automatic and manual operation

Tour Activation: Automatic 35-user programmable time slots per day, independently programmed for each of seven days

June 07, 2002

Monitor Output

Video Outputs: AC coupled, 0 VDC

On-Screen Displays: Video input number or pseudo number
Video input title or Preset title: 16 character
programmable
Alarm Title: 48 characters programmable with
color background

Time: 24-hour clock

Date: Selectable formats MM-DD-YY, DD-MM-YY,
YY-MM-DD

Status: Alarm, Dwell Time, and Hold

Display Format: White characters with black outline, height of 9
TVL

Display Position: Adjustable both horizontal and vertical, and
brightness control
User on/off control of video input number and
monitor status, video input/target title, and/or
date and time

Character Sets: English, Spanish, French, German, and
Portuguese

Alarms

Alarm Call-up: 1024 alarm inputs
Programmable to call any video input or
salvo/zone to monitors
Programmable to initiate any preset or auxiliary
output relay

Alarm Display Modes:

Auto Sequence: sequences multiple alarms until cleared

Auto Hold: displays initial alarm until cleared, queues
subsequent alarms

Sequence and Display: earliest alarm is displayed on one monitor
until cleared; subsequent alarms are
sequenced on a second monitor

Block Auto Sequence: alarms are sequenced on blocks (groups) of
monitors; a block consists of up to 16
contiguous monitors

June 07, 2002

Block Auto Hold: alarms are displayed on blocks of monitors,
subsequent alarms are queued; multiple
blocks may be defined

Alarm Clearance Modes:

Acknowledge:..... operator removes alarms manually from a
keyboard

Instant Auto Clear: removes alarms when the alarm input clears
or when acknowledged from a system
keyboard

Instant Auto Clear/

No Manual Acknowledgment: .. removes alarms when the alarm input clears
only

Auto Clear: removes alarms approximately 20 seconds
after the alarm input or when acknowledged
from a system keyboard

Auto Clear/

No Manual Acknowledgment: .. removes alarms approximately 20 seconds
after the alarm input only

Connections

AD High Speed Data Line: Minimum one BNC connector

ARCNET: Minimum one RJ45 connector

Parallel Port: Minimum one DB25 for printer connection

Redundant Power Supply: One removable terminal connector

Optional multi-protocol control code module:

Manchester: Three removable terminal connectors

RS-422: One removable terminal connector

SensorNet: Six removable terminal connectors

Electrical

Supply Voltage: 90-264 V, 47-63 Hz (auto sensing)

Power Requirements: 180 watts maximum per bay

Redundant Power Supply Input: +8 VDC @ 10A

-8 VDC @ 5A

Mechanical

Mounting: 19-inch EIA rack mount, 5 U high for up to
168 video inputs and 12 video outputs; 10 U
for up to 168 video inputs and 24 video
outputs

June 07, 2002

Dimensions (H x W x D):

168 inputs by 12 outputs: 222 x 432 x 406 mm (8.75 x 17 x 16 in)

168 inputs by 24 outputs: 444 x 432 x 406 mm (17.5 x 17 x 16 in)

Weight: 18.2 Kg (40 lbs.)

Up to 16 plug-and-play modules capable of being hot swapped with power applied and automatically configure themselves for proper operation. Modules have color-coded markers to easily identify modules.

Environmental

Operating Temperature: 0 - 50°C (32 - 122°F)

Relative Humidity: 5 - 95% (non-condensing)

Regulatory

Emissions: FCC Part 15, Subpart B, Class A; EN55022
Class B (CE)

Immunity: EN50082-1 (CE)

Safety: UL1950; CSA 22.2, No 950-95; EN60950
(CE)

2.02 JOYSTICK KEYBOARD CONTROLLER

A. Description

Microprocessor based, full-function keyboard for complete control and programming of AD1024 matrix switcher/controller systems.

B. Performance Specifications

The keyboard shall provide all control parameters and system programming required for the video matrix switcher/controller system. The operator keys shall be full travel, electro-mechanical style, and shall provide true tactile feel.

The keyboard must be provided with a three axis, vector-solving joystick, with pushbutton, for single-handed control of fixed and variable speed cameras pan/tilts and domes. This joystick must be a "twist" joystick to allow the user to control a motorized lens' TELE and WIDE functions without using operator keys. The joystick must also have a pushbutton to FLIP appropriately equipped domes 180 degrees to provide continuous surveillance of subjects that pass directly underneath the dome; the user will not have to rotate the joystick 180 degrees or remove the hand from the joystick to press a key.

As a minimum, the keyboard shall provide for the following control functions: video output (monitor) selection, satellite site selection, video input (camera) selection, motorized lens control (zoom, focus, iris), pan/tilt or dome control (pan/tilt, Preset set and call, Pattern set, call, clear, hold and repeat), auxiliary device control (on or off), tour control (hold, run, next and last), salvo control, alarm control, and camera lock/unlock feature. In addition, the keyboard shall provide

June 07, 2002

macro keys that enable the programming of up to 1000 application-specific, user-definable macros.

When used with the AD1024 Matrix Switcher/Controller System, the keyboard shall provide the following recorder control functions for both VCRs and digital recorders: Play, Record, Rewind, Fast Forward, Pause, Stop, Eject.

Both application-specific as well as user-definable macro key labels shall be provided with the keyboard. These labels shall affix directly to the keys on the keyboard.

When used with the AD1024 Matrix Switcher/Controller System, the keyboard shall provide for the synchronization of macro key programming; this enables macro keys to be "transferred" to similar keyboards.

In order to prevent unauthorized access to system programming functions, a key operated switch, along with a removable key, shall be provided.

LEDs must be provided to quickly indicate initial numbers entered and provide system confirmation of site, monitor, and camera selections. When used with the AD1024 Matrix Switcher/Controller System, the keyboard's LEDs must also provide confirmation of recorder selection.

The keyboard shall be provided with a standard bi-directional RS-232 communication port for interfacing to the matrix switcher/controller system. This port must provide field programmable baud rates of 1200, 2400, 4800, 9600, 19200 or 38400 baud. The RS-232 protocol must be compatible with that used by American Dynamics.

The keyboard shall permit user programming of LED display brightness and both activation/deactivation and volume control of the internal beeper. A self-test mode must also be provided to verify hardware and software operation of the LED display, communications port, joystick calibration and memory.

The keyboard shall be compatible with desktop or rack mounted configurations.

The keyboard shall be an American Dynamics AD2088 Series or equivalent.

C. Minimum Performance Specifications

The microprocessor based keyboard, which provides complete control and programming of the AD MegaPower 1024 matrix switcher/controller system, shall meet the following operating requirements:

General

Site Selection:..... 16 sites, user selectable
Monitor Selection:..... 999 monitors, user selectable
Recorder Selection 2048 recorders, user selectable
Camera Selection: 9999 cameras, user selectable
Macro Selection: 1000 macros, user definable
Keyboard displays:

June 07, 2002

Site: Displays currently selected satellite site
Monitor/VCR: Displays currently selected video output or recorder
Camera: Displays currently selected video input
Enter: Displays numeric value for entry into the keyboard
Self-Test: Verification that both hardware and software operation are working for the communications port, LED's, joystick calibration and memory

Keyboard Control

Utility Features:

F1 and F2: Function keys provide access to special system functions (e.g., user log on/log off)
Site: Addresses satellite systems
Key Switch: Prevents unauthorized access to programming functions and system programming menus (removable key provided)
Numeric Keypad: Enters numbers associated with video outputs (Monitors), Recorders, video inputs (Cameras), Macros, and Users
Clear: Erases numbers entered on the numeric keypad before pressing an action key, such as Camera, Monitor, Macro, or User number

Monitor Control:

Monitor: Calls a specified monitor to be controlled by the keyboard
Program: Enables programming of system tour dwell times

Camera Control:

Ack: Acknowledges and removes the displayed alarm from system
Camera: Calls a specified camera (video input) to the selected monitor (video output)
Run: Starts a monitor tour, universal (system) tour or alarm tour for the currently selected monitor
Hold: Halts the monitor tour, universal (system) tour or alarm tour for the currently selected monitor

June 07, 2002

- Next: Calls the next programmed camera display for the respective monitor, universal (system) tour, or alarm tour
- Last: Calls the previous programmed camera display for the respective monitor, universal (system) tour, or alarm tour, and continues running the tour in reverse order
- Salvo: Displays a pre-defined group (salvo) of camera inputs on a group of contiguous monitors, beginning with the currently selected monitor

Recorder Control:

- VCR: Calls a specified VCR or digital recorder to be controlled by the keyboard
- Play: Plays the VCR or digital recorder
- Pause: Pauses the VCR or digital recorder
- Rewind: Rewinds the VCR or digital recorder
- Fast Forward: Puts the VCR or digital recorder in fast forward mode
- Record: Puts the VCR or digital recorder in record mode
- Stop: Stops the VCR or digital recorder
- Eject: Ejects the tape from the VCR or the DAT from the digital recorder

Macro Control: Initiates a series of up to 1000 user-defined events.

Pan/Tilt & Dome Control:

- Joystick: Vector solving joystick allows pan (left and right), tilt (up and down) and zoom (tele and wide) control of fixed or variable speed pan/tilts or domes and motorized lenses. Flip pushbutton flips suitably-equipped domes 180 degrees.
- Iris Open: Allows more light into the selected camera
- Iris Close: Allows less light into the selected camera
- Focus Near/Far: Adjusts the clarity of the viewed scene
- (Auxiliary) On: Activates features such as lights, locks, or alarms that can be controlled via the keyboard
- (Auxiliary) Off: Deactivates features such as lights, locks, or alarms that can be controlled via the keyboard

June 07, 2002

Shot (Preset): Programs or calls pre-defined scenes for
suitably equipped pan/tilts and domes

Pattern: Programs, calls or repeats a pre-defined
sequence of movements for suitably equipped
pan/tilts and domes

Data Ports

One RS-232, 8-pin modular RJ-45 jack

Programmable Baud Rates: 1200, 2400, 4800, 9600, 19200, 38400

Electrical

Input Voltage: 9 VAC supplied by external transformer
120 VAC, 50/60 Hz (AD2088)
230 VAC, 50/60 Hz (AD2088X)

Power: 5 watts

Mechanical

Mounting: Desktop or Rack mountable

Weight: 2.6 Kg (5.5 lb)

Dimensions (H x W x D)

Desktop: 76 x 133 x 419 mm (3.0 x 5.25 x 16.5 in)

Racked: 133 x 38 x 483 mm (5.25 x 1.5 x 19 in)

Environmental

Environment: Indoor

Temperature: 0° to 40°C (32° to 104°F)

Relative Humidity: 90% (non-condensing)

Regulatory Approvals

UL: UL1950

CSA or cUL: CSA 22.2 No. 950-95

TUV: TUV IEC 950, EN 60950

CE: CE IEC 950, EN 60950

Conducted Emissions: EN50081-1: 1991
EN55022: 1987

Radiated Emissions: EN50081-1: 1991

ESD Immunity: EN50082-1: 1991
IEC 801-2: 1984

June 07, 2002

RF Immunity: EN50082-1: 1991
IEC 801-3: 1984
EFT Immunity: EN50082-1: 1991
IEC 801-3: 1984

2.03 17" COLOR MONITOR

A. Description

High resolution, 17-inch color video monitor with 550 TV lines of resolution.

B. Performance Specifications

The monitor shall have a 44 cm (17-inch) diagonal, 90 degree deflection, flat square type CRT picture tube with 550 TV lines of resolution through the Y/C input and 450 lines through the composite video inputs.

The monitor must accept PAL and NTSC signals, and must feature an auto-select function to identify the input signal and switch modes automatically.

The monitor must incorporate a universal power supply, allowing it to be compatible with a voltage range of 120 - 230 VAC (50/60 Hz), $\pm 10\%$. Power consumption must not exceed 72 watts.

The monitor must be shipped with both North American NEMA 5-15P and Continental European CEE 7/7 power cords.

The monitor must have two looping composite video, one looping Y/C video, and two looping audio inputs. The video inputs must have auto termination circuitry.

The monitor shall have a built-in audio speaker with an output of 1 watt. The audio input signal must "follow" the input selection.

The monitor must utilize a "brightness peak suppression" system (BPS) to reduce the load on the CRT and extend the life of the unit. This system must have the effect of automatically moderating the levels of peak brightness. The precise level of moderation must be selectable via set-up menu.

The monitor will feature an internal comb filter for enhanced picture quality.

The monitor must have on-screen menu driven controls for selection of image aspect ratio, color temperature, video system, and brightness peak suppression (BPS). The functions of contrast, brightness, chroma, and phase must be instantly adjustable via push buttons on the front panel, each having its own momentary on-screen display.

The monitor must contain a latching power switch which remains in the set position, either on or off, regardless of incoming power status. This means that the unit does not have to be physically turned back on after a power loss.

The monitor must have a heavy-duty metal cabinet to protect the CRT and circuitry. An optional rack mount kit must be available.

June 07, 2002

The monitor must be able to operate to full specifications within the normal temperature range of 0° to 40° C (32° to 104° F).

The monitor shall be an American Dynamics AD9517 Series or equivalent.

C. Minimum Performance Specifications

The monitor must meet the following requirements:

Operational

Picture Tube: 17-inch diagonal 90° deflection, flat square CRT

Resolution: 550 TV lines (Y/C)

Comb Filter: Internal

Video Input:

Level: 1.0 Vp-p, composite NTSC/PAL

Impedance: HiZ / 75 Ohm, auto termination

Audio Output: 1 watt

Mechanical

Dimensions (H x W x D):

Cabinet: 334 x 395 x 420.5 mm (13.15 x 15.55 x 16.6 in)

Rack Mount: 399 x 483 x 406.4 mm (15.75 x 19 x 16 in)

Unit Weight: 17.2 Kg (37.9 lbs.)

Shipping Weight: 18.0 Kg (39.6 lbs.)

Color: Charcoal gray bezel with beige cabinet

Construction: Metal Case

Electrical

Supply Voltage: 120 - 230 VAC (50/60Hz) ±10%

Power: 72 watts

Controls

Front Panel: Phase, Chroma, Bright, Contrast, Menu*,
Volume +/- and Power

* Menu includes image aspect ratio, color temperature, video system, and brightness peak suppression (BPS).

Connectors

Rear Panel: IEC320 connector; AC in, Video A (in/out),
Video B (in/out), Y/C (in/out), Audio A (in/out),
Audio B (in/out), and Remote (in/out)

June 07, 2002

Power Cord:..... NEMA 5-15P (N America)
CEE 7/7, GS

Environmental

Temperature: 0° to 40° C (32° to 104° F)
Relative Humidity: 20 - 80% (non-condensing)
Storage Temperature: -25° to 55° C (-13° to 131° F)

Regulatory

Emissions:

FCC: Part 15 Subpart B, Class B
CE:..... EN50082-1
Meets Canadian ICES-003
Meets Australia/New Zealand EMC

Immunity:

CE:..... EN50082-2
Meets Australia/New Zealand EMC

Safety:

UL: UL1950
CSA: C22.2, No. 950
CUL: EN60950
DHHS: Rules 21 CFR, Subchapter J
ROV: Yes

2.04 MULTIPLEXERS

A. Description

The Simplex Multiplexer design shall be a solid-state microprocessor based video processor. Designed to operate with black-and-white or color composite video signal, the device shall provide a variety of multiple camera and single camera display options, multiplexed video output and enhanced live display or playback with video recorder equipment and remote operation in stand-alone or matrix controller applications. Features shall include high-speed switching rate, automatic detection of VCR speed when used with a VCR that provides a timing signal, activity detection and prioritized camera sampling and image enhancement by a proprietary sharpening algorithm. All display and programming features shall be available from either the front panel or an optional remote panel or computer terminal. The multiplexer shall be capable of using computer generated time synchronization, alarm generation, alarm monitoring and other features via third-party software.

B. Performance Specifications

The multiplexer shall be available in a 16-camera model. Each model multiplexer shall be available with a configuration of one composite video output, alarm input and alarm output for each associated composite video input. All models shall be available with one alarm hold input, one video recorder input, one RS-232 remote command input, one RS-232 remote command output, two video monitor outputs, and one video recorder output. On-screen programming will be available for selection of the processor's features, and shall allow on-screen programming of an attached device. A front panel LED status display shall be available, indicating power and feature activity.

Termination for all video inputs shall be selectable at 75 ohms (default) or HI-Z (∞). Composite video input signal strength shall be 1 volt peak-to-peak. Cameras should be true 2:1 interlace devices for best system performance. Calibration of camera phase shall not be necessary for operation.

Alarm inputs shall be compatible with normally open (NO) contact closures or TTL/CMOS inputs. An alarm hold input shall allow control of the alarm duration by the alarm output of another device; this signal shall be a voltage in the range of +5V to +15V, or a TTL/CMOS compatible active high input.

Standard video recorder input shall be composite video in normal mode at 1.0 volt peak-to-peak signal strength at 75 ohms.

Control input shall be available from the (optional) manufacturer's remote panel. This unit shall also allow control by standard ASCII 3-character RS-232 control signals from an optional remote panel, host terminal or computer. The multiplexer shall be capable of using computer generated time synchronization, alarm generation, alarm monitoring and other features via third-party software. The multiplexer shall have bi-directional communication to support third-party software.

Two video monitor outputs shall be amplified requiring 75-ohm termination at their respective monitors. Video monitor output shall be available in multiplexed and in analog format. Video output shall be available from the video processor at the main monitor output in live or playback mode.

Camera output from the multiplexer shall be available at 1-volt peak-to-peak signal strength. Loop out video signal shall be unprocessed. Switchable impedance shall be provided for normalization of composite video signal when looping through the multiplexer. Unused camera outputs shall not require physical termination at 75 ohms.

One alarm output shall echo each alarm input for each camera. Alarm outputs shall be TTL/CMOS signal (selectable polarity). An additional alarm relay output shall provide 1 amp not to exceed 42VAC or 60VDC (resistive only) for normally open (NO) and normally closed (NC) contacts, respectively.

The video recorder output (standard VCR) shall be multiplexed composite video in normal mode at 1-volt peak-to-peak signal strength at 75 ohms. Output resolution is limited by the resolution of the video recorder, but shall not be less than 512 x 464 pixels per image (NTSC/EIA) or 512 x 512 pixels per image (PAL/CCIR).

All features of the Simplex Multiplexer shall be operable from the front panel controls.

June 07, 2002

- A combination of push-button controls shall allow access to the system setup menus and other special functions.
- A combination of push-button controls shall allow single camera recording.
- A combination of push-button controls shall allow display of a color bar pattern for monitor calibration purposes.
- Push-button controls shall allow display of up to 16 cameras on the main monitor output in live without record mode.
- A combination of push-button controls shall allow the display of an alarm counter table that records the number of alarm inputs by associated camera received by the unit.
- A combination of push-button controls shall toggle the time/date display.
- A push-button shall control display of videotape input on main monitor output. All live display features shall be available in playback mode.
- A push-button control shall sequence full screen images at the main monitor output.
- Push buttons shall control the video output to either monitor.
- All menu settings and activity detection setup shall be accomplished using the front panel push-button controls.
- A push-button control shall start full-screen multiplexed recording of all cameras.

The operator shall be able to define the specific range of the unit's performance by selecting from a menu of features provided through an on-screen programming function. The type and scope of performance features shall be as follows:

- A menu feature shall allow the setting of the unit's time and date display. A combination of front panel push-button controls shall allow the operator to select whether time and date is displayed or hidden in the main monitor output.
- A menu feature shall allow each video input to be titled with up to eight characters from a set including the alphabet, numbers from 0 to 9, and punctuation marks.
- A menu feature shall allow setting a global dwell rate for all video inputs from 1 to 99 seconds in duration.
- A menu feature shall allow setting individual activity detection parameters for each camera. A combination of front panel push-button controls shall set up to 16 horizontal and 12 vertical activity detection targets for each camera.
- Menu features shall allow the operator to select whether a TTL/CMOS alarm input/output is of the active high or active low type.
- A menu feature shall allow the duration of the alarm response to an alarm input to be set at a range from 2 seconds to 999 seconds from the receipt of the input signal.

June 07, 2002

- Menu features shall control the display and duration of alarm messages associated with external alarms and video loss alarms.
- A menu feature shall set normal and alarm speed settings for output to an attached video recorder. The unit shall operate at these settings in the event the auto detect video recorder speed signal is lost.
- A menu feature shall control the front panel security lock. This feature shall disable all front panel controls with the exception of those pushbuttons that allow re-entry of the setup mode.
- A menu feature shall control a filter circuit that reduces the jitter associated with high-resolution compressed multi-camera images. A push-button control shall toggle this setting to allow the operator to determine its effectiveness in live mode.
- A menu feature shall allow a status display for output to the main monitor. When this feature is enabled, a message shall indicate whether the unit is recording all cameras or one camera from the video recorder output.

In live without record mode, signal from the main monitor output shall be available as: full-screen image from a single camera or multiple camera displays in 2 x 2, 3 x 3, or 4 x 4 format. Sequential switching of each camera in full screen at a globally assigned dwell rate shall be available. No signal shall be available at the video recorder output in live without record mode.

Camera selection shall be controlled from the front panel of the multiplexer. Unprocessed video from any selected camera input shall be available for display from the call monitor output.

In record mode, signal from the main monitor output shall be available as full-screen image from a single camera or sequential switching of each camera in full screen at a globally assigned dwell rate. No multi-camera display shall be available at the monitor output in record mode.

The multiplexer shall increase the number and rate of images from any camera input provided to the video recorder output based upon the number of cameras with activity detected or the number of alarms generated during recording. The multiplexer shall be able to record a single "priority" camera exclusively. If the on-screen record status display has been enabled, a message shall reflect whether one or all cameras are being recorded.

All simplex display features shall remain available while playing back a video recording. There shall be no signal to the video recorder output while the multiplexer is playing back a video recording.

The multiplexer shall detect and respond to mechanical alarms, recorded alarms and video loss. When a mechanical alarm occurs in the live without record mode, the multiplexer shall alert the operator. When a mechanical alarm occurs in the record mode, the multiplexer shall alert the operator and pass the images associated with the alarm event to the video recorder output.

Mechanical Alarms in Live Without Record Mode

The first mechanical alarm received shall signal the unit to:

- start the alarm duration counter chip (if enabled),
- activate the alarm output relay,

June 07, 2002

- provide a full screen image of the associated video input at the call monitor output,
- light the alarm indicator light (above the camera button),
- switch the main monitor to the highest multi-camera format if the alarm camera is not already on display and display the on-screen alarm message.

The multiplexer shall remain in the alarm state until ALL of the following occur:

- all contact alarms are released,
- the alarm duration time elapses, and
- the alarm hold input is released.

Additional alarms shall signal the multiplexer's call monitor output to cycle through full screen displays of cameras with alarms at the programmed dwell time. All alarm response features shall be initiated for each subsequent alarm.

These conditions shall remain in effect until all alarm inputs are removed from ground and the alarm duration period for all alarms has elapsed. Multiple alarms shall be processed in the order they occur.

Mechanical Alarms in Record Mode

The first mechanical alarm received shall signal the unit to:

- start the alarm duration counter chip (if enabled),
- activate the alarm output relay,
- provide a full screen image of the associated video input at the main and call monitor output and display the on-screen alarm message on the main monitor,
- switch to the VCR Alarm Record Time encoding rate,
- encode the camera as "alarm" and send it to the VCR on a priority basis,
- light the alarm indicator light (above the camera button).

The multiplexer shall remain in the alarm state until ALL of the following occur:

- all contact alarms are released,
- the alarm duration time elapses, and
- the alarm hold input is released.

Additional alarms shall signal the multiplexer's call monitor output to cycle through full screen displays of cameras with alarms at the programmed dwell time. All alarm response features shall be initiated for each subsequent alarm.

These conditions shall remain in effect until all alarm inputs are removed from ground and the alarm duration period for all alarms has elapsed. Multiple alarms shall be processed in the order they occur.

When a live mechanical alarm occurs in the playback mode, the multiplexer shall process the event in the background. When the multiplexer detects the initial live alarm in tape mode, it shall:

- toggle the alarm relay,
- activate the alarm output,
- display the associated camera at the call monitor output.

Multiple alarms shall be processed in the order they occur. No alarm messages shall be displayed.

The multiplexer shall encode each field of recorded video with alarm status information, camera number, camera title, time and date. The multiplexer shall detect recorded alarm events by monitoring the VIS information returned from the video recorder input. The processing of recorded alarms shall be completely independent from live alarm processing.

When the multiplexer detects a recorded alarm while in playback mode it shall:

- flash the associated camera (1-16) light and
- overlay the associated video input image with the ALARM message at the main monitor output.

The multiplexer shall remain in the alarm state until:

- the recorded alarm event ends and
- the alarm duration time elapses.

Multiple recorded alarms shall be processed in the order in which they occur. The multiplexer shall detect recorded alarm events at any playback speed. When a tape is played at the speed it was recorded, the duration of each alarm shall be the same as the original event.

The multiplexer shall detect loss of video at any connected video input by monitoring the input video synchronization signal. The multiplexer shall respond to loss of input video by alerting the operator and providing the associated input image with an event message to the video recorder output.

When the multiplexer detects loss of input video it shall:

- flash the associated camera (1-16) light, and
- display the VIDLOSS message on the main monitor.

Multiple video loss alarms shall be processed in the order they occur.

All functions of the multiplexer shall be available for remote operation. Each function shall be represented by a simple three-character ASCII code transmitted by RS-232 through an RJ-11 connector on the rear panel of the multiplexer.

An optional remote control panel shall provide a second control point up to 1,000 feet from the base unit. Remote control panel operation shall be identical to the front panel's operation. The

multiplexer shall allow multiple multiplexers or multiple remote panels to be connected in a daisy chain configuration.

The multiplexer accepts remote control data in the following format:

Data Rate: 1200 bps

Start bits: 1

Data bits: 8

Stop bits: 1

Parity: none

The multiplexer shall be approximately 311mm deep x 432mm wide x 44.4mm high (12.2" D x 17" W x 1.75" H). Using hardware adapters provided as a kit, a single unit shall fit into a standard 19" rack. The multiplexer shall have a rack height of 1 unit (44.4mm. or 1.75") The unit shall weigh approximately 4kg (9 lbs).

Front panel switches shall have tactile response (click) and a minimum operating life of 100,000 cycles when operating at a maximum rate 2 cycles per second. The buttons shall be devoid of sink marks. They shall be the same color as the case color. They shall be accompanied by labels indicating the nature of each function and by LEDs indicating activity of the function or features associated with each switch.

Rear panel connectors and controls shall be labeled indicating the intended origin or intended destination of the input or output available at each connector, or the associated feature controlled. The specific type of connector or control shall be as follows:

- The power connector shall accept a female 2.1mm pin-jack, with a positive center conductor.
- The alarm input shall be a DB37-S (socket) with gold-plated contacts.
- The remote input shall be a RJ-11 (socket) with gold-plated contacts. Receive and transmit pin locations shall be in accordance with DCE equipment.
- Both monitor outputs shall be BNC female connectors with four center gold-plated contacts.
- The VCR input shall be a BNC female connector with four center gold-plated contacts.
- The VCR output shall be a BNC female connector with four center gold-plated contacts.
- Each of 16 video inputs shall be a BNC female connector with four center gold-plated contacts.
- Each of 16 video outputs shall be a BNC female connector with four center gold-plated contacts.

The following standards and requirements shall apply to the signal processing and communications features of the unit:

June 07, 2002

- NTSC standard documents — *EIA Recommended Standards RS-170 and RS-170A*.
- PAL standard document — *CCIR Report 624: Characteristics of Television Systems*.
- CE compliance documents — *EN55022 Emissions and IEC801-2, -3, -4 Immunity from ESD, RF field, and Lightning*.
- RS-232 document — *Interface between Data Terminal Equipment and Data Communications Equipment Employing Serial Binary Data Interchange* (Washington, DC: Electronic Industries Association, 1969).

The multiplexer's video input and output signal shall conform to RS170 and RS-170A standards. During menu setup, the display output shall produce a blank black background display. The main monitor output when all video inputs are displayed shall be windows of equal size and color value in normal live and playback modes.

Chroma and luma outputs shall be designed and calibrated to avoid color smearing or incorrect position in quadrant or expanded display.

The transmit and receive signal of the unit shall be asynchronous with an RS-232 electrical interface. The data format of the signal shall be of 8 data bits with 1 start and 1 stop bit, at null parity, transmitted at 1200 baud. The maximum connection length for transmission shall be 300 meters (1,000 feet).

The multiplexer shall require a 12VDC power source. It shall be functional with a DC supply voltage of 12VDC \pm 10%. The power source shall be able to deliver a minimum of 1.0 Ampere at 12VDC. The power consumption of the unit shall be approximately 12W at 12VDC.

The multiplexer shall operate successfully in a temperature range between 5° to 40° C (40° to 104° F). The multiplexer shall operate successfully in a humidity range of 5-95% relative humidity

The multiplexer must be supported by a 24/7/365 Technical Support Hotline.

The multiplexer will have a five-year manufacturer's warranty.

The multiplexer shall be a Robot SMV916p-30 or equivalent.

C. Minimum Performance Specifications

Operating Defaults

Record Function	ON
Recording Status	REC ALL
Alarm Message Display	ON
Alarm Message Latch	OFF
Video Loss Alarm	ON
Alarm Input Polarity	ACT LOW
Alarm Output Polarity	ACT HI
Display Record Status	ON

Image Tenderizer	OFF
VCR Record Time	24 hours
VCR Alarm Record Time	24 hours
Alarm Duration	4 seconds
Global Dwell	2 seconds
Camera Titles	Camera Number
Motion Setup Screen	All targets selected
Security Lock	OFF
Video Format	
NTSC Color or EIA B&W	
PAL Color or CCIR B&W	
Video Level	
Camera Inputs	1.0 V p-p, 75 ohms
Camera Outputs	1.0 V p-p, 75 ohms
VCR Input	1.0 V p-p, 75 ohms
VCR Output	1.0 V p-p, 75 ohms
Monitor Output	1.0 V p-p, 75 ohms
Alarm	
Camera Alarm Input	One input per camera. Activated by mechanical contact or TTL/CMOS active level.
Alarm Hold Input	+5 to +15 VDC or TTL/CMOS active high.
Alarm Duration	4-second default. Menu selectable from 1 to 999 seconds.
Alarm Output	Normally open (NO) and normally closed (NC) contacts with shared common: 1.0 A not to exceed 42 VAC or 60 VDC (resistive only)
Display	
Colors	16,777,216 colors (24 bits)
Gray Shades	256 (8 bits)
Full Screen Format (pixels)	512x464 (NTSC/EIA) 512x512 (PAL/CCIR)
2x2 Format	256x232 (NTSC/EIA) 256x256 (PAL/CCIR)

June 07, 2002

3x3 Format	170x154 (NTSC/EIA) 170x170 (PAL/CCIR)
4x4 Format	128x116 (NTSC/EIA) 128x128 (PAL/CCIR)

Controls

Soft touch, rubberized push buttons with indicator lights (LEDs).

Function	Used in combination with other buttons to access special functions.
VCR view	Displays VCR output on main monitor.
Sequence (Up arrow)	Provides full-screen sequenced image display. Scrolls up through available characters on setup menu.
2x2 (Down arrow)	Provides a four-camera image display (quad). Scrolls down through available characters on setup menu.
3x3 (Left arrow)	Provides a nine-camera image display. Selects previous option on setup menu.
4x4 (Right arrow)	Provides a 16-camera image display. Selects next option on setup menu.
Live	Enters live mode (display only, no recording).
Tape	Enters tape playback mode.
Record	Starts recording all cameras, cancels one camera recording.
Call	Displays a full-screen camera image on the call monitor.
Camera 1–16	Selects a camera for viewing or one camera recording.

Connectors

Power	2.1 mm pin-type female. Power input.
Remote in	RJ11. Remote Control Panel Option or control via RS-232 data.
Remote out	RJ11. Use with Remote Control Panel for daisy chaining to another Simplex.
Gnd	Ground screw.
Alarms	DB37-S. Alarm control via contact closure or TTL/CMOS signal.
Call Mon	BNC. Video signal output to call monitor.
Main Mon	BNC. Video signal output to main monitor.
VCR In	BNC. Composite video input from VCR.

June 07, 2002

VCR Out	BNC. Composite video output to VCR.
Cam In	BNC. Composite video input from camera.
Cam Out	BNC. Composite video output from camera (passive loop through).
Electrical	
Power Requirements	12 Watts (center positive 12 VDC) at least 1 Amp
Physical Characteristics	
Dimensions	17 in. (432 mm) Wide 12.25 in. (311 mm) Deep 1.75 in. (44 mm) High
Unit Weight	9 lbs. (4 kg)
Shipping Weight	11 lbs. (5 kg)
Environmental Requirements	
Temperature	40–104°F (4–40°C)
Humidity	5–95%RH no condensing
Altitude (operating)	0–10,000 ft. 0–3,048 meters
Options	
Remote Control Panel	Includes front panel assembly, desktop stand, rack mount brackets, and 50-foot cable.
19 inch Rack Mount Kit	RM03

2.05 DIGITAL VIDEO MANAGEMENT SYSTEM

A. Description

The digital video management system design shall be a microprocessor-based video processor, multiplexer and recorder. Designed to operate with black-and-white and color composite video signals, the device shall compress and multiplex video images from up to 16 cameras and store them in the unit's image database. It shall provide a variety of multiple- and single-camera display options, operator-selected activity target settings, playback, image enhancement tools and several alarm/event triggered response options. The unit shall provide operator-definable live filters to record and trigger alarm events when the light level changes, motion is detected or a perimeter is crossed. The unit shall provide operator-definable filters to search the image database for light changes, motion and perimeter violations, as well as camera, date/time and filter settings, and then display a list of matching video segments. It shall provide for simultaneous recording, playback, transmitting, database searching and archiving. All display

features shall be available from an on-screen interface. Some features shall also be available from an optional manufacturer-specific camera control device. All programming features shall be available from an on-screen programming interface. The unit shall provide for network operation with an optional manufacturer-specific software application.

B. Performance Specifications

The digital video management system shall be available with 16 camera inputs, 16 alarm inputs, one PS/2 style mouse input, one PS/2 style keyboard input, one SVGA monitor output, one composite video output, one composite TV Out connector, one S-Video TV Out connector, 16 camera outputs (passive loop through), 16 alarm outputs, one serial communications connector, one printer output, two USB connectors and one network connector. In addition, optional connectors for one 56Kb modem connection, one SCSI-3 connection, and a call/spot monitor composite TV Out connection shall be available. On-screen programming shall be available to select and configure the unit's features. A status display of LED's shall be available, indicating power and feature activity.

Video inputs shall all terminate with 75 ohms. The input video connections shall be standard BNC jacks connectable with any BNC UG/U type mating connector. Composite video input signal strength shall be 1 volt peak-to-peak. Cameras should be true 2:1 interlace devices for best system performance. Calibration of camera phase shall not be necessary for operation.

Four 12-pin connectors with screw terminals shall be provided with a total of 16 alarm inputs, 16 alarm outputs and 11 grounds. Alarm inputs shall accept normally open (NO) contact closures or TTL/CMOS signal (programmed for Active High or Active Low). Alarm outputs shall provide TTL/CMOS signal Active High, driven to +4V and able to drive 6mA.

A standard mouse input device shall be provided to operate the on-screen program features. The mouse input port shall be a small round PS/2 style connector.

A small round PS/2 style connector shall be provided for an optional PS/2 style keyboard.

A DB9-P connector shall be provided to operate some on-screen features from an optional manufacturer-specific camera control device.

Principal display output shall be available from the SVGA adapter at 16.7 million colors or 256 shades of gray at a resolution of 800x600 pixels. The SVGA output port shall be a standard DB15-S connector.

Composite video output to an optional live monitor shall be amplified. The output connection shall be a standard BNC jack connectable with any BNC UG/U type mating connector.

Main monitor output to a standard television or other video device shall be provided using composite and S-Video connectors. The output connection for composite video shall be a standard RCA style connector. The output connection for S-Video shall be a standard S-Video style connector.

Camera output from the unit shall be available at 1-volt peak-to-peak signal strength. The loop-through video signal shall be unprocessed. RG59/U (75 ohms impedance) cable shall be used for all video signal connections. The unit shall provide selectable termination. Therefore, unused camera outputs shall not require physical termination at 75 ohms.

Printer output shall be available through a parallel port on the rear panel.

Network connectivity shall be available through a network port on the rear panel.

Optional data output to an optional external storage device shall be available through a SCSI-3 connector on the rear panel.

Optional call/spot monitor connection shall be available through a composite TV Out connector on the rear panel.

Optional 56Kb modem connection shall be available through a connector on the rear panel.

The following display features of the digital video management system shall be operable from the main screen:

- Lights shall indicate unit operation.
- Screen controls shall select individual cameras for viewing.
- A screen control shall select the alarm review function.
- A button/jog shuttle screen control shall control playback direction and speed.
- A Go To playback control shall permit selection of any point in a video segment.
- Screen controls shall select the display format of one, four, nine or 16 cameras.
- A screen control shall display unit status information.
- A screen control shall display cameras sequentially.

The following controls and indicators shall be available on the front panel:

- An LED shall indicate unit power, recording and alarm status.
- A power button shall be provided through a pinhole on the front panel.
- A reset button shall be provided through a pinhole on the front panel.

The operator shall be able to define the specific range and mode of the unit's performance by selecting from a menu of features provided through an on-screen programming function. The operator shall be able to access all program features of the unit by using the provided mouse input device and an on-screen virtual keyboard. An input port for use with an optional keyboard shall be provided. The type and scope of performance features shall be as follows:

- A menu feature shall allow each video input to be titled with up to ten characters from a set including the alphabet, numbers from 0 to 9 and selected punctuation marks.
- A menu feature shall allow the operator to select termination for each video input.
- A menu feature shall allow a system administrator to define the name, personal identification number (PIN) and privileges for each user of the digital video management system.
- A menu feature shall allow the operator to define a schedule of recording and archiving for all cameras, a different schedule for each camera, or a schedule for a single camera. Simplified choices of weekday, weekend and holiday schedules shall be available, with holidays defined by the operator.
- A menu feature shall allow the operator to select the number of images recorded per second during normal operation. A range of one to 60 images per second NTSC (0.8 to 50 PAL) shall be available.
- A menu feature shall allow the operator to select a different alarm record rate during alarm events.

- A menu feature shall allow the operator to select the quality, or level of compression, of images recorded during normal operation. Three compression levels shall be available for selection: super resolution, normal and extended record.
- A menu feature shall allow the operator to select the sensitivity, or threshold of activity, of images recorded during normal operation. Two sensitivity levels shall be available for selection: high and normal.
- A menu feature shall allow the assignment of target areas within the field of view of one or more attached video cameras. Operator-selected filters for perimeter protection, motion detection or light level changes shall control recording of activity within these areas. Filter selection shall be available for both day and night operation.
- A menu feature shall allow the operator to select how the unit stores images during normal operation. The unit shall allow either linear recording, stopping when the database is full, or the continuous recording of images by overwriting the oldest images already stored.
- A menu feature shall allow the operator to select the duration of the unit's alarm response, from a minimum of five seconds to a maximum of five minutes.
- A menu feature shall allow the operator to select from a range of alarm response options, including video loss, alarm message on-screen display, alarm latch (requiring manual clearing of alarms) and energizing alarm output 16 (in addition to the associated camera's alarm output).
- The unit shall provide a front panel indication that an alarm event has occurred.
- The unit shall increase the record rate for each camera in an alarm state.
- A menu feature shall allow each alarm input to be titled with up to ten characters from a set including the alphabet, numbers from 0 to 9 and selected punctuation marks.
- A menu feature shall allow the selection of alarm input polarity for each individual input. The unit shall accept alarm input signals of the TTL/CMOS Active High/Active Low type.
- A menu feature shall allow setting a global dwell rate from one-second to two minutes in duration for the display of all video inputs in sequence.
- A menu feature shall allow selection of video overlay information during playback.
- A menu feature shall allow the live display of any attached video camera in any location on the multi-camera display grid. This menu setting shall also allow the operator to reset the camera display to its number order default.
- A menu feature shall allow the setting of the unit's time and date display. This setting shall establish the time and date of images in the database.
- A menu feature shall allow the setting of the data lifetime limit by camera, preventing access to recorded video after the specified period.

- A menu feature shall allow the operator to define the static communication port address for networking.

In live mode, video output shall be available as a signal in single-camera format at 640x480 pixels, in four-camera format at 320x240 pixels per pane, in nine-camera format at 213x160 pixels per pane or in 16-camera format at 160x120 pixels per pane. When full-screen display is selected, the signal in single-camera format shall be resized to 800x600, in four-camera format to 400x300 per pane, in nine-camera format to 267x200 per pane or in 16-camera format to 200x150 per pane.

Camera selection for display shall be controlled from the main screen. It can also be controlled from an optional manufacturer-specific camera control device.

Sequential switching of each camera in full screen or in the lower right quadrant shall be controlled through on-screen programming. It can also be controlled from an optional manufacturer-specific camera control device.

A call/spot monitor option shall permit an additional video monitor either to display a single camera's live video signal or to automatically display video in sequence from alarmed cameras. In playback mode, images shall be displayed in a single-camera format at 640x480 pixels. The unit shall also be able to display playback images in single-camera, full-screen format at 800x600 pixels. The unit shall allow operator selection and display of stop-action or frozen images of any stored image while in playback mode. The unit shall allow magnification of a display image up to a factor of 16 times its original size.

Playback tools shall provide the means to enhance any stored image for display or output to an attached printer. This selection of tools shall include image enhancement, image sharpening, brightness and contrast control, and hue and saturation/lightness control.

In playback mode, the unit shall allow a selected image to be saved to a floppy disk or loaded from a floppy disk and displayed on the unit. The unit shall allow the use of enhancement tools on the loaded image.

Images stored in the database shall be identified to allow search and retrieval by type of event or image. Searches shall be specified by alarm, camera number, date/time, event type (i.e., video loss) or filter. Search results shall be provided in a scrollable list to allow selection for display. A data lifetime feature shall allow users to delete data on a user-defined basis, either system wide or camera-by-camera.

The digital video management system shall be approximately 445mm deep x 432mm wide x 172mm high (17.5" D x 17" W x 6.75" H). A single unit shall fit into a standard 19" rack. The unit shall have a rack height of four units (172mm or 6.75"). The unit shall weigh approximately 12.75 kg (28 pounds).

The case material shall be 18GA steel, 0.045" thick, material specification CRS Electro-Galvanized per ASTM-A591. All exterior edges must be broken and deburred to a uniform curve and smoothness.

The case color shall be matte black on the front and rear panels. The case color shall be textured black matte on the upper surface and sides to resist fingerprints. The paint specification shall be semi-gloss black to match Industrial Polymer Group color IPG-6-31-0 or nearest equivalent.

Front panel power and reset switches shall have a tactile response (click) and a minimum operating life of 100,000 cycles when operating at a maximum rate of two cycles per second. The buttons shall be accessible through pinholes on the front panel.

Rear panel connectors and controls shall be labeled indicating the intended origin or intended destination of the input or output available at each connector, or the associated feature controlled. The specific type of connector or control shall be as follows:

- The power input connector shall accept an IEC-320-C13 plug.
- The alarm connectors shall be four 12-pin connectors with screw terminals for a total of 16 alarm inputs, 16 alarm outputs and 11 grounds.
- The serial communications port shall be a DB9-P (plug) with gold-plated contacts. Receive and transmit pin locations shall be in accordance with DCE equipment.
- The video monitor output shall be a BNC female connector with four center gold-plated contacts.
- The SVGA output shall be a DB15-S connector with gold-plated contacts. It shall accept a standard SVGA DB15-P connector with a 9U-AWM-E89980-SUNF low-voltage cable attached.
- The optional external storage connector shall be a DB68-S SCSI-3 connector with gold-plated contacts.
- Printer output shall be available through a parallel port on the rear panel. This port shall be a DB25-S connector with gold-plated contacts.
- Each of 16 video inputs shall be a BNC female connector with four center gold-plated contacts.
- Each of 16 video outputs shall be a BNC female connector with four center gold-plated contacts.
- The network connector port shall be an RJ-45 Category 5 twisted-pair Ethernet (CAT 5 TPE) connector.
- The optional modem connector port shall be an RJ-11 single-pair phone line connector.

The digital video management system shall be equipped with an SVGA monitor as a principal display device. This monitor shall be capable of display at 800x600 pixels, with a 0.28" dot pitch, non-interlaced, at 60 to 70 Hz refresh rate.

The unit shall contain 4 half-height, IDE controlled hard disk drives, each with a minimum capacity of 100 GB, for a combined total of up to 400 GB.

The operating system shall be contained within a 4.0 GB partition on one of the drives.

Assuming 16 installed cameras, normal resolution and moderate activity, the digital video management system shall be able to store at least 114 hours of images at a record rate of 30 images per second (25 ips PAL).

Image transfer or system software update shall be available through an internal 1.44 MB, 3.5", half-height, IDE controlled floppy disk drive.

Removable data storage shall be available through an optional internal Digital Audio Tape (DAT) drive. This drive shall be a 5.25" half-height, SCSI-controlled DDS-4 tape drive, using 150 meter DDS-4 (20.0 GB), 125 meter DDS-3 (12.0 GB) or 120 meter DDS-2 (4.0 GB) DAT tapes.

The unit shall be equipment with a CD-RW drive unit.

June 07, 2002

Network access shall be available through an internal network card that supports 10BASE-T (10Mbps) and 100BASE-TX (100Mbps) network operation.

Dial-up access shall be optional through an internal modem card that supports 56Kb network operation.

The following standards and requirements shall apply to the signal processing and communications features of the unit:

- NTSC standard documents — EIA Recommended Standards RS-170 and RS-170A.
- PAL standard document — CCIR Report 624: Characteristics of Television Systems.
- FCC compliance document — FCC Part 15, Subpart B.
- CE compliance documents — EN55022 Electromagnetic Field Emissions; IEC801-2, -3, -4 — Immunity from ESD, RF field and Lightning.

The digital video management system video input and video output signal shall conform to RS-170 and RS-170A standards. During system operation or configuration in on-screen programming mode, the SVGA display output shall produce a blank black background on which the system graphic interface shall be displayed. The display output when multiple video inputs are displayed shall be windows of equal size and intensity value in normal live and playback modes.

The digital video management system shall be a Sensormatic Intellex[®] D6C80B0EA0 or equivalent.

C. Minimum Performance Specifications

The digital video management system must meet the following operating requirements:

Video Format

Color (input and output)	NTSC or PAL
B&W (input and output)	EIA or CCIR

Video Level

Camera Inputs.....	1.0 V p-p, 75 ohms
Camera Outputs.....	1.0 V p-p, 75 ohms
Analog Output.....	1.0 V p-p, 75 ohms

Alarm

Alarm Inputs.....	Sixteen inputs. Activated by contact closure or TTL/CMOS signal. Programmable polarity.
Alarm Outputs.....	Sixteen outputs. TTL/CMOS compatible active high. Driven to +4V and can drive 6mA. Initialized to inactive low on power-up.
Alarm Duration	Programmable from five seconds to five minutes.

Display

Color Palette.....	16,777,216 colors (24 bits)
Gray Shades.....	256 (8 bits)
Display Controls.....	Mouse-selectable buttons with indicator lights.

June 07, 2002

Record Options

Record Mode Linear, Circular
Image Sensitivity High, Normal
Image Quality Super Resolution, Normal, Extended Record
Record Rate 60ips, 45ips, 30ips, 15ips, 7.5ips, 2.5ips, 1ips NTSC
(images per second)..... (50ips, 37.5ips, 25ips, 12.5ips, 6.25ips, 2ips, 0.8ips PAL)

On-Screen Controls

Camera (1-16)..... Selects camera for viewing.
Alarms Selects alarm review function.
Play/Pause..... Controls playback direction and speed of selected video segment.
GoTo..... Moves quickly to any point in a video segment.
1x1 button..... Selects 1x1 picture display format.
2x2 button..... Selects 2x2 picture display format.
3x3 button..... Selects 3x3 picture display format.
4x4 button..... Selects 4x4 picture display format.
Status Displays status information for each camera.
Sequence..... Accesses sequential display options.
Full Screen Switches display to full-screen mode.
Search..... Selects image database search screen.
Utility Displays utility options menu.
Archive Displays archive options menu.
Setup..... Displays setup options menu.
Help Displays onscreen help topics.

Rear Panel Connectors

Camera In BNC. Composite video input from camera.
Camera Out BNC. Composite video output from camera
(passive loop through). Programmable termination.
Alarm..... Alarm connector block with screw terminals.
Keyboard Standard PS/2-style connector.
Mouse Input device with standard PS/2-style connector.
Monitor..... DB15-S. Live display SVGA monitor output.
TV Out (Composite) RCA type. Composite video output.
TV Out (S-Video) S-Video. Composite video output.
Printer..... DB25-S. Parallel printer output.
Com2 DB9-P. Input from manufacturer-specified dome controller.
Network..... RJ-45. Category 3 or Category 5 twisted-pair Ethernet (CAT 3 TPE or CAT 5 TPE) connector.
Video Out BNC. Composite video output.
SCSI-3 Optional high-density 68-pin female connector. Optional data storage.
Call/Spot Monitor..... Optional call/spot monitor provides an additional composite output (1 V p-p, 75 ohms).
Modem Optional internal 56Kb modem card provides dial-up communication.

June 07, 2002

Components

Main Monitor	SVGA capable of 800x600, non-interlaced, 60–70 Hz refresh rate.
Diskette Drive	1.44 MB, 3½", half-height.
Hard Drives	One, two or four 3½", half-height, IDE.
Digital Audio Tape Drive.....	DDS-4 internal tape drive, 5¼", half-height (3½", half-height with adapter kit), SCSI-3 connection (optional).
Digital Audio Tapes	150-meter DDS-4 (20.0 GB), 125-meter DDS-3 (12.0 GB) or 120-meter DDS-2 (4.0 GB).
Network Interface.....	Supports 10BASE-T (10Mbps) and 100BASE-TX (100Mbps) network operation.
Modem Card.....	Supports 56Kb dial-up communication.

Power Supply

Input	115VAC, 50/60 Hz, 3.0 A
	230VAC, 50/60 Hz, 1.5 A
	Requires IEC-320-C13 plug.

Physical Characteristics

Dimensions.....	432mm (17") Wide
	445mm (17.5") Deep
	172mm (6.75") High
Unit Weight.....	12.75 kg (28 lbs)
Shipping Weight.....	17.25 kg (38 lbs)

Environmental Requirements

Temperature	5–40° C (41–104° F)
Humidity.....	5–95% RH non-condensing
Altitude (operating).....	0–3,048 meters (0–10,000 feet)
with tape drive.....	0–2,133 meters (0–7,000 feet)

2.06 OUTDOOR PAN/TILT/ZOOM SPEED DOME

A. Description

High-speed programmable dome with high resolution DSP color or black and white camera and a minimum 176X zoom capability.

B. Performance Specifications

The dome assembly must be comprised of a high-speed pan/tilt assembly, high resolution color or black and white camera with 176X zoom. The 176X zoom is to be achieved with no less than a 22X optical zoom lens with up to 8X digital zoom magnification. The camera/lens assembly must provide for continuous, full-time autofocus.

The pan/tilt mechanism must incorporate a sealed precision slip-ring to provide 360 degrees of continuous rotation. Precise manual panning and tilting must be achievable through a combination of variable speed operator control (speed ranges) and automatic adjustment of these speed ranges dependent upon zoom factor. Pan speeds must range from 0.5 to 100 degrees per

second. Tilt operating speeds must be from 0.5 to 60 degrees per second. The same amount of picture shall appear to move across a monitor regardless of the zoom factor. High-speed, DC servo motors must be used to maintain high torque through the entire operating range. These motors must use pulse width modulation and encoder feedback to control the acceleration, speed, and deceleration of the motors to ensure smooth, precise, accurate and fluid movement. The design shall use direct drive motors and no belt to ensure long term reliable operation.

The design of the dome shall not require the use of a bubble to be covert, but should support the option of a clear, smoked, silver or gold bubble.

The dome assembly shall contain a built-in multi-protocol receiver/driver for use with matrix switching systems using one of the following protocols: AD Manchester control code and a single 18 AWG shielded twisted pair (STP) to support up to three daisy chained domes a maximum of 1,500 m (5,000 feet), SensorNet control code and a single 22 AWG unshielded twisted pair (UTP) to support up to 32 daisy chained domes a maximum of 1,000 m (3,000 feet), or SEC RS-422 control code and two pairs of 22 AWG shielded twisted pair (STP) cabling to support up to 10 daisy chained domes a maximum of 1,000 m (3,000 feet). The receiver/driver will provide all voltages for camera controls, pan and tilt functions and all motorized lens functions.

The dome shall support 96 Presets and three Patterns. The dome shall also support a Home Position that automatically returns the dome to a Preset or Pattern after a specified period of inactivity, 1-60 minutes.

The dome must support a minimum of eight privacy zones to prevent users from viewing sensitive or secured areas. So as not to interfere with normal surveillance operations, these on-screen "shields" must block out only the area that has been defined as sensitive. The privacy zones should not cause the screen to blank out when the sensitive area is within the camera's field of view. On the monitor, the privacy zones should appear larger or smaller depending on the camera's zoom factor.

The dome must support on-screen programming of dome parameters, including proportional flip, direction indicators and azimuth, maximum zoom stop, line-lock or crystal synchronization, AGC, white balance, alarm actions and default states, and home position. On-screen programming of dome name, 16 Area names, 96 Preset names, three Pattern names, and four alarm names must also be provided. All of this on-screen programming, as well as the rest of the on-screen displays, must be available in the following languages: English, French, Italian, German, Spanish, and Portuguese. Password protection must be provided to prevent unauthorized access.

Dome direction indicators and azimuth reading; Dome, Area, Preset, Pattern, and alarm names; and zoom, focus, and iris status must be displayable on the monitor. All on-screen text character attributes must be user-selectable solid or translucent white, with or without black outline.

The dome assembly design shall contain a single alarm input standard or four alarm inputs as an option and be field programmable to receive "normally open" or "normally closed" contacts. If operating on a SensorNet or RS-422 network, the dome shall be capable of receiving the alarm and transmitting the alarm back to the switching system and/or reacting to the alarm event independent of the switching system. If operating on a Manchester network, the dome must be able to process the alarm internally, and automatically activate a Preset or Pattern.

June 07, 2002

The dome assembly shall contain a single auxiliary output standard or three independent auxiliary outputs as an option. Each open collector output must respond as momentary or latching (depending on system capability).

The open collector of each auxiliary shall be required to handle + 12 VDC at a maximum of 40 milliamps.

The complete dome assembly must be capable of operating to full specification with an applied voltage of 20 to 36 VAC at a frequency of 50 or 60 Hertz and meet Class 2 standards. The power consumption cannot exceed 16 watts with all functions operating. The dome assembly shall have surge protection for the video, communications and power connections.

The color camera shall be a 1/4-inch CCD interline transfer device. Color models shall provide a minimum horizontal resolution of 470 lines with a usable video signal with a scene illumination of better than 1.0 Lux (20 IRE with AGC on) and 0.05 Lux (with an open shutter selection).

The video output synchronization shall be 2:1 interlace and will observe the NTSC or PAL (color models) or EIA RS-170 or CCIR (black & white models) standards. Line-lock with an adjustable vertical phase must also be provided.

The lens must be a color corrected, 4-88 mm, F1.6 and must have continuous autofocus with manual override. The lens must also have auto-iris with manual iris override.

The dome shall incorporate a twist-lock release base for ease of installation and service. Two versions of the twist-lock base must be available. A standard base will enable the installer to wire directly the dome's housing/eyeball assembly before twisting the assembly onto the base. This standard base option shall support one alarm input and one auxiliary output. A second base that enables the installer to wire the appropriate cables onto an I/O board contained within the twist-lock base must also be available. The I/O base enables wiring to be completed once, and for the housing/eyeball assembly to be connected and disconnected to the twist-lock base without disturbing the wires or connections. This I/O base option shall support four alarm inputs and four auxiliary outputs. Each base will include diagnostic LED's to indicate power and proper communications to and from the matrix.

An installation tool that enables service personnel to connect and disconnect the housing/eyeball assembly without the use of a ladder or lift must be available. The dome and bases must be available separately so installation of the bases can be accomplished by qualified personnel prior to the purchase of the dome or housing/eyeball assembly. An outdoor housing must also be available and shall provide for the same ease of installation and service.

Upon initial power up and after dome resets, diagnostic tests must be run, including communication loopback, camera loopback, and motor circuit tests. The results of these tests must be displayable on the monitor. After initialization, the dome shall automatically pan, tilt and zoom to its previous position.

The dome shall be an American Dynamics DeltaDome™ II or equivalent.

June 07, 2002

C. Minimum Performance Specifications

The dome must meet the following operating requirements:

Operational

Pan Speed: 0 - 100 degrees/second
Pan Range:..... 360 degrees, continuous
Tilt Speed: 0 - 60 degrees/second
Tilt Range:..... Greater than 105 degrees
Presets: Factory installed encoders provide pan and tilt position feedback

Mechanical

Mounting Base/Housing and Eyeball Assembly Twist lock assembly. Two versions; standard and I/O base with no wires between base and assembly.

Dimensions (H x D): 205 mm x 120 mm (8 in x 4.7 in)

Mounting Options: Ceiling, wall, corner, pendant mounts and Top Hat, available; outdoor housing options available

Bubble options (for Top Hat):..... Clear (f0)
Smoked (f0.5)
Silver (f1.5-2.0)
Gold (f1.5-2.0)

Integral Receiver / Driver

Control Code: AD Manchester, SensorNet or SEC RS-422

Maximum Daisy Chain Devices:

AD Manchester: 3 Domes, up to 1,500 m (5,000 feet)
SensorNet: 32 Devices up to 1,000 m (3,000 feet)
SEC RS422:..... 10 Domes up to 1,000 m (3,000 feet)

Presets: 96 (depending on system capability)

Controllable Functions: Pan, Tilt, Zoom, Focus (Manual/Auto), Iris (Manual/Auto)

Patterns: 3—Program, Recall and Autorepeat

Camera and Lens

Scanning Format

Color:..... NTSC or PAL
Black & White: EIA RS-170 or CCIR

June 07, 2002

Imager:..... ¼ inch interline transfer CCD

Resolution

Color:..... Minimum 470 TVL horizontal

Black & White: Minimum 500 TVL horizontal

Sensitivity

Color:..... Minimum of better than 1.0 Lux (20 IRE with AGC on)

Minimum of 0.05 Lux with open shutter

Black & White: Minimum of 0.05 Lux (20 IRE with AGC on)

Minimum of 0.01 Lux with open shutter

Synchronization:..... Phase adjustable line-lock

S/N Ratio:..... 48 dB

Lens: 4-88 mm, F1.6, with manual iris override

Programmable Features

Zoom Stop Factors

First Zoom Stop:..... 22X or 33X

Maximum Zoom: Up to 176X

Automatic Gain Control: On or Off; adjustable if set to Off

White Balance: On or Off

Red Setting: Adjustable if White Balance is set to Off

Blue Setting: Adjustable if White Balance is set to Off

Proportional Flip: On or Off

Line Lock: On or Off

Alarm Processing: Internal (by dome), External (by controller) or Both

Area Boundaries: Up to 16

Presets: 96, number of Presets dependent on system capability

Home Position: Dome assumes a specified Preset or Pattern after a time-out period

Privacy Zones: Minimum eight

Direction Indicators/Azimuth Reading: . On or Off

Alarm Input States: Normally Open or Normally Closed

Programmable Names: User definable names (up to 19 characters each) for camera, Presets, Patterns, Areas, and alarms

June 07, 2002

Dome Status

Information:..... Text overlay can display status of zoom, focus, and iris; can choose to display direction indicators and name information for dome, Preset, Pattern, Areas, and alarms

On-Screen Text

Appearance:..... Choice of outline or no outline for text overlay; solid or translucent white characters

Language: English French Italian, German, Spanish and Portugal

Password Protection: 3 to 8 character, user programmable, to prevent unauthorized access to programmable features

Electrical

Power:..... The power requirements will be 24 VAC (+50 to -14 percent) at a frequency of 50 or 60 Hertz. The power consumption of the 24 VAC can not exceed 16 watts with all functions operating

Surge Protection: Video, power, communication and alarm

Video: Series resistor of 3.9 Ohm; low capacitance Zener suppressor of 6.5 V, 1500 watts

SensorNet/Manchester: Isolation transformer coupled, 2000 Vrms; PTC resettable fuse protects transformer; TVS rated at 5.6 V, 40A, 0.1 joules; 10kA impulse rated gas tube

RS422: Series resistors of 33 Ohms; TVS rated at 5.6 V, 40 A, 0.1 joules

Alarm input: Series resistors of 33 Ohms; TVS rated at 5.6 V, 40A, 0.1 joules

Power line: TVS rated at 60 V, 250A, 1.5 joules

Alarm inputs

I/O Board Base: 4 Normally Open (NO) or Normally Closed

Standard (Pigtail) Base: 1 Normally Open (NO) or Normally Closed

Environmental

Operating Environment: Indoor or Outdoor (with special housing)

Operating Temperature:

Indoor: -10° C to 50° C (14° F to 122° F)

Outdoor: -40° C to 50° C (-40° F to 122° F)

June 07, 2002

Relative Humidity: 0 to 95 % non-condensing

Regulatory

Emissions: FCC: 47 CFR Part 15, Subpart B, Class A

CE: EN55022 Class B

Immunity: CE: EN50082-1

Safety: UL: UL1950

cUL: CSA 22.2 No. 950

CE: EN60950

2.07 HIGH-RESOLUTION COLOR CAMERA

A. Description

One-third inch high-resolution color digital CCD camera with 1.5 lux low light sensitivity and at least 470 TV lines of resolution.

B. Performance Specifications

The camera must incorporate a 1/3-inch CCD array with interline transfer and Digital Signal Processing (DSP) to produce no less than 470 TV lines of resolution. The CCD array active pixel count must be no less than 768 (H) x 494 (V) for NTSC and 752 (H) x 582 (V) for PAL.

The camera must produce usable video at 1.5 lux and provide an automatic electronic shutter and automatic gain control to assure it will operate in a wide range of lighting conditions using manual iris lenses. For more extreme lighting conditions, the camera must support the use of DC-type and EE-type auto iris lenses. The camera must accept either C or CS mount lenses without the use of an adapter ring.

The camera must provide phase adjustable line-lock for "roll-free" switching, with a RESET feature to return to the default setting.

The camera must provide switchable Back Light Compensation (BLC), and a White Balance that can be set at Auto, or adjusted manually for color temperature. The camera must also offer Automatic Electronic Shutter, Automatic Gain Control, and Aperture Correction.

The camera shall be a Sensormatic ADC762 (NTSC), ADC762X (PAL) or equivalent.

C. Minimum Performance Specifications

One-third inch high-resolution color digital CCD camera shall meet the following operating requirements:

Operational

Imager: Interline transfer 1/3-inch CCD array

Video Output: 1.0 Vp-p / 75 Ohm, composite

June 07, 2002

Active Pixel Count

NTSC:..... 768 (H) x 494 (V) pixels

PAL: 752 (H) x 582 (V) pixels

Minimum Scene Illumination:..... 1.5 lux (F1.2 lens)

Horizontal Resolution: 470 lines

Digital Signal Processing: Yes

Light Compensation Modes: Automatic electronic shutter, On/Off

NTSC:..... 1/60 - 1/100,000 sec.

PAL: 1/50 - 1/100,000 sec.

Auto Iris Drive: DC or EE-type

Backlight Compensation: On/Off selectable

Aperture Correction: Yes

Synchronization Modes:..... Internal/Line-lock with phase adjust

White Balance: Auto or Manual Modes

Geometric Distortion:..... None

S/N Ratio: -50 dB

Controls

Automatic Electronic Shutter: On/Off

Back Light Compensation: On/Off

Back Focus: Adjustment ring, with lock

Auto Iris: DC/EE-type, switchable

DC Iris: Level control

Automatic Gain Control: On/Off

Synchronization: Internal/Line Lock

White Balance: Auto/Manual

Connectors

Input Power: Screw terminals

Composite Video:..... BNC

Video Iris:..... 4 pin square connector

DC Iris: 4 pin square connector

Electrical

AC Voltage:..... 24 VAC (+33%, -15%), 50/60 Hz

June 07, 2002

DC Voltage:..... 12 VDC (+15%, -10%)

Power:..... 4.4 Watts

Mechanical

Lens Mount: C or CS type

Camera Mount:..... ¼ inch - 20 (top or bottom)

Dimensions (H x W x L):..... 58 x 52 x 126 mm (2.28 x 2.04 x 4.96 in)

Unit Weight:..... 450 g (1.0 lb)

Shipping Weight:..... 600 g (1.325 lbs)

Color:..... Light gray

Environmental

Temperature: -10° to 50°C (14° to 122°F)

Relative Humidity: 90% (non-condensing)

Regulatory

FCC: Part 15, Class B

UL: UL2044

CE:..... EN50082-1, EN55022, EN60950, EN50130-4

2.08 CAMERA LENSES

A. Description

High quality, auto iris lenses available in both 1/3-inch and 1/2-inch formats, fixed and variable-focal lengths.

B. Performance Specifications

The lens shall be 1/3-inch format.

The lens shall be a “CS” mount.

The 1/3-inch format lenses shall be available in fixed focal lengths of 2.6 mm, 4 mm, and 8 mm, and variable focal lengths of 3.5-8 mm and 5-40 mm.

The lens must utilize the circuitry contained within suitably equipped cameras that produce a DC output. This circuitry will adjust the lens iris accordingly.

The lens shall provide manual focus adjustments.

The lens must offer high contrast, fast signal response; color corrected optics, and low geometric distortion.

The lens must have a Neutral Density (ND) filter, allowing for an f-stop of f360.

June 07, 2002

The lens must be terminated with a standard 4-pin DC iris connector for direct connection to all American Dynamics series cameras.

The lens shall be an American Dynamics "LD" series or equivalent.

C. Minimum Performance Specifications

The lens must meet the following requirements:

Fixed Focal Length, DC Iris (1/3-inch format)

Focal Length:..... 2.6 mm, 4 mm, or 8 mm

Aperture (f-stop):

2.6 mm:..... f1.6

4.0 mm:..... f1.2

8.0 mm:..... f1.2

Mount: CS

View Angle (H x V):

2.6 mm:..... 96.7° x 74.9°

4.0 mm:..... 63.9° x 49.1°

8.0 mm:..... 34.7° x 25.9°

Minimum Object Distance:

2.6 mm:..... 0.1 m (0.32 ft)

4.0 mm:..... 0.2 m (0.65 ft)

8.0 mm:..... 0.2 m (0.65 ft)

Weight:

2.6 mm:..... 47 g (1.64 oz)

4.0 mm:..... 38 g (1.36 oz)

8.0 mm:..... 39 g (1.33 oz)

Size (Diameter x Length):

2.6 mm:..... 32 x 34.7 mm (1.26 x 1.37 in)

4.0 mm:..... 32 x 33 (1.56 x 1.29 in)

8.0 mm:..... 32 x 33 (1.56 x 1.29 in)

Fixed Focal Length, DC Iris (1/2-inch format)

Focal Length:..... 3.6 mm, 6 mm, or 12 mm

Aperture (f-stop):

3.6 mm:..... f1.6

June 07, 2002

6.0 mm:..... f1.4

12.0 mm:..... f1.4

Mount: CS

View Angle (H x V):

3.6 mm:..... 99.2° x 74.1°

6.0 mm:..... 58.3° x 44.3°

12.0 mm:..... 30.4° x 23.1°

Minimum Object Distance:

3.6 mm:..... 0.2 m (0.65 ft)

6.0 mm:..... 0.2 m (0.65 ft)

12.0 mm:..... 0.3 m (1.0 ft)

Weight:

3.6 mm:..... 40 g (1.41 oz)

6.0 mm:..... 37 g (1.31 oz)

12.0 mm:..... 35 g (1.23 oz)

Size (Diameter x Length):

3.6 mm:..... 32 x 33.0 mm (1.26 x 1.30 in)

6.0 mm:..... 32 x 33.0 mm (1.26 x 1.30 in)

12.0 mm:..... 32 x 33.0 mm (1.26 x 1.30 in)

Variable Focal Length, DC Iris (1/3-inch format)

Focal Length:..... 3.5-8 mm

Aperture (f-stop): f1.4

Mount: CS

View Angle (H x V):..... 77.5°-35.3° x 57.6°-26.4°

Minimum Object Distance: 0.4 m (1.32 ft)

Weight: 48 g (1.70 oz)

Size (Diameter x Length): 45 x 54.6 mm (1.77 x 2.15 in)

Variable Focal Length, DC Iris (1/3-inch format)

Focal Length:..... 5-40 mm

Aperture (f-stop): f1.6

Mount: CS

View Angle (H x V):..... 53.6°-6.5° x 40.2°-4.8°

June 07, 2002

Minimum Object Distance: 1.0 m (3.27 ft)
Weight: 190 g (6.71 oz)
Size (Diameter x Length): 56.2 x 75.5 mm (1.98 x 2.97 in)

Variable Focal Length, DC Iris (1/2-inch format)

Focal Length:..... 4.5-10 mm
Aperture (f-stop): f1.6
Mount: CS
View Angle (H x V):..... 85.3°-37.7° x 62.1°-28.2°
Minimum Object Distance: 0.3 m (1.0 ft)
Weight: 150g (5.36oz)
Size (Diameter x Length): 45.0 x 54.6 (1.77 x 2.15 in)

2.09 CORNER MOUNT ENCLOSURE

A. Description

Tamper resistant, compact, corner mounted housing primarily designed for use in elevators. This housing is also perfect for stairwells, entrances, hallways, small offices, jail holding rooms, etc.

B. Performance Specifications

The camera housing must be a fully enclosed, corner mount design to allow for inconspicuous camera placement and excellent protection.

The camera housing must allow for easy access to the camera and lens installed in the housing. The maximum camera/lens combination length must be no less than 241 mm (9.5 in), including connectors.

The camera housing must have camera brackets with adjustable slots to allow for front to back and vertical camera movement.

The camera housing shall be constructed of 14-gauge steel throughout, with a 6.35 mm (0.25 in) thick, distortion free, replaceable Lexan window. All mounting bolts and cable entries must be protected.

The housing must be secured from unauthorized entries by the use of two tamper resistant button head security screws.

The housing will have a beige, baked enamel finish on all exposed surfaces of the unit.

The camera housing shall be an American Dynamics AD1305 or equivalent.

C. Minimum Performance Specifications

The camera housing must meet the following requirements:

Mechanical

Construction:

Housing: 1.9 mm (14 gauge) steel

Viewing Window: 6.35 mm (0.25 in) thick Lexan

Finish:..... Baked enamel texture

Color:..... Beige

Weight: 4.13 Kg (9.1 lbs.)

Cable Entry:..... Through the back opening

Locking: Two tamper resistant button head security
screws

Maximum Camera/Lens Size: 241 mm (9.5 in)

Camera Mounting:..... Brackets with adjustable slots allow for front to
back and vertical camera movement

2.10 SMALL INTERIOR WEDGE MOUNT ENCLOSURE

A. Description

Low profile, tamper-resistant wedge ceiling housing designed to accommodate most solid-state camera and lens combinations.

B. Performance Specifications

The camera housing must be a fully enclosed, low profile design to allow for inconspicuous camera placement and excellent protection.

The camera housing must allow for easy access to the camera and lens installed in the housing. The maximum camera/lens combination length must be no less than 231 mm (9.10 in), and the maximum width must be no less than 76.2 mm (3.38 in) including connectors.

The camera housing shall be an all-metal construction, enabling the housing to be used in plenum-rated ceilings.

The back box must be constructed of 1.2 mm (18 gauge) steel, and the lower housing must be constructed of 1.5 mm (16 gauge) steel.

Four ½ inch electrical knockouts must be provided for cable entry.

The viewing window must be constructed of 6.35 mm (0.25 in) thick Lexan.

The housing will have a beige, baked enamel texture finish.

The camera housing will feature tamper resistant locking screws to provide an additional level of security.

Optional 2x2 drop ceiling mounts and drop ceiling rail kits must be available for the housing if required.

The camera housing shall be an American Dynamics AD1301 or equivalent.

C. Minimum Performance Specifications

The camera housing must meet the following requirements:

Mechanical

Construction:

Back Box: 1.2 mm (18 gauge) steel

Housing: 1.5 mm (16 gauge) steel

Viewing Window: 6.35 mm (0.25 in) thick Lexan

Housing Finish: Baked enamel texture

Color: Beige

Unit Weight: 1.82 Kg (4 lbs.)

Cable Entry: ½ inch electrical knockouts (x4)

Maximum Camera/Lens Size: 231 mm (9.10 in)

Camera Mounting: ¼ inch - 20

2.11 ENVIRONMENTAL ENCLOSURE

A. Description

High quality environmental housing designed to provide an excellent barrier against indoor and outdoor environments for most CCD cameras with fixed or zoom lenses.

B. Performance Specifications

The camera housing must provide a unique 180° opening cover to provide full and easy access to the camera and lens for trouble-free installation and servicing.

The maximum camera/lens combination length must be no less than 304.8 mm (12.0 in), including connectors.

The housing must have a camera platform that can be secured in any position along the full length of the housing. This platform shall be constructed of a rigid non-conductive material to help eliminate common grounding problems.

The camera housing must be constructed of a high-impact Magnum® 941 Polymer with a 4.8 mm (.19 in) Lexan® viewing window.

The camera housing will protect against water and dust intrusion and meet a minimum of IP63 and NEMA-3R ratings. An optional sunshield must be available to protect the entire top half of the housing from solar radiation.

June 07, 2002

The housing must offer an optional thermostatically controlled pad heater and automatically regulate its output to provide heat in the housing and maintain a clear viewing window. The heater shall operate with either 24 VAC or 24 VDC supply voltages.

The housing must offer an optional thermostatically regulated 24 VAC blower.

Two weatherproof glands must be provided on the bottom of the housing for cable entry.

The camera housing must have a light gray epoxy finish.

The housing must be secured from unauthorized entries by the use of tamper resistant screws.

Optional wall or ceiling mounts must be available for the camera housing. The mounts must have a weight load capacity of no less than 9.1 Kg (20 lbs.), and have a light gray finish to match the camera housing. The mounts shall be suitable for indoor or outdoor applications.

The camera housing shall be an American Dynamics AD1314 Series or equivalent.

C. Minimum Performance Specifications

The camera housing must meet the following requirements:

Mechanical

Construction:

Housing: Magnum® 941 Polymer

Viewing Window: 4.8 mm (.19 in) Lexan®

Finish:..... Epoxy

Color:..... Light gray

Dimensions (H x W x L):..... 141 x 159 x 449 mm (5.56 x 6.2 x 17.68 in)

Unit Weight:

Without sunshield: 1.8 Kg (4.0 lbs.)

With sunshield: 3.2 Kg (7.0 lbs.)

Cable Entry:..... 2 weatherproof glands

Max. Camera/Lens Length:..... 304.8 mm (12.0 in)

Camera Mounting:..... Non-metallic multi-position front to back adjustment

Heater Kit:

Type: Thermostatically controlled pad heater

Supply Voltage:..... 24 VAC/VDC (12-30V)

Power: 0.63 A maximum

Weight: 68 g (0.15 lbs.)

Blower Kit:

June 07, 2002

Supply Voltage: 24 VAC

Environmental

Weatherproof Standard: IP63 (NEMA-3R)

Operating Temperature: -23° to 43° C (-10° to 110°F) with heater/blower

Regulatory
CE

2.12 CAMERA POWER SUPPLIES

- A. Multi-camera power supplies shall be Pelco UL listed series MCS8-5 or equivalent.

2.13 STAINLESS STEEL CAMERA HOUSING

- A. Custom corner mount stainless steel camera housings shall be provided as outlined in the Scope of Work.

2.14 NETWORK CLIENT 2.2 SOFTWARE

A. Description

The software accessory shall be a tool for retrieving and viewing live or recorded video images from one or more Intellex[®] Digital Video Management Systems. These images shall be transmitted over a TCP/IP wide area network (WAN), local area network (LAN), or a dial up modem. The accessory shall be available as a software package to be installed on a high performance desktop computer, with integrated central processing unit, keyboard, mouse, Windows[®] 98, Windows[®] 2000 or Windows NT[®] 4.0 operating system and monitor. The desktop computer shall be purchased separately, according to the specifications in this document.

The software accessory shall function as a retrieval device on a network to which one or more Intellex units are connected. The software shall provide status information on all Intellex units connected to the network. It shall provide for retrieval of live video, alarm lists and user-selected video segments, image playback and image enhancement.

The software accessory shall provide for storing and managing downloaded video in a Windows Explorer-like component sorted within categories. It shall also provide for master timekeeping for all Intellex and associated software devices on the network and allow secure access to the Intellex setup menu for system configuration changes.

B. Performance Specifications

The software accessory shall require a desktop computer which meets the following minimum requirements: an Intel[®] Pentium[®]-based CPU clocked at 233MHz or more (with MMX), 64MB of RAM, one 2GB (minimum) devoted free space on the hard disk with at least 10MB available for program installation, one 4X speed internal CD-ROM drive, a monitor with 800 x 600 resolution and capable of displaying 16-bit color, a 56KB modem or 10BASE-T or 100BASE-TX network card (match to the network configuration) using the TCP/IP protocol, a video graphics card with 8MB video RAM that supports DirectDraw[®] for Windows NT or the operating system used, Microsoft's Windows 98, Windows 2000 or Windows NT 4.0 Server or Workstation (Service Pack 4 or higher).

The software accessory shall include a CD-ROM with the software, a proprietary hardware key and product documentation. The hardware key shall be installed on the parallel printer port on the desktop/laptop computer.

Printer output shall be available through a parallel port on the rear panel. The hardware key shall provide pass-through for printer data via a DB25-S connector on the rear of the hardware key.

The software accessory shall be configured so that the on-screen information may be displayed in a local language. This language shall be defined during installation.

Data entered by an operator, such as a folder name, shall be displayed in the language used for entering the data. Messages generated by the software device shall appear in a local language.

The software device shall support a local date format configured in the Windows operating system.

The main screen shall contain the controls and indicators for normal operation as well as access to all other system functions.

- Program menus shall provide access to functions such as database, category and incident management, display of video information, display of toolbar and status bar, alarm and video retrieval, refresh instruments, instrument status, instrument setup, live video display, time synchronization, display configuration, remote instruments, communication ports, live camera defaults, image enhancement, status retrieval and on-line help.
- A toolbar shall provide easy-to-use, point and select icons that access commonly used functions for both live video and playback video displays.
- Saved incidents and incident categories shall be visible in the directory tree on the left side of the main display. Pop-up menus for administering these incidents and categories shall be accessible using the right mouse button. Selecting an incident from a category shall enable the playback screen, functions and toolbar.
- User annotations to incidents shall be visible and editable in a pane accessed with a left mouse click to the notes tab when the incident is selected. A pop-up menu for editing annotations shall be accessible using the right mouse button.
- Intellex instruments and their cameras that are active on the network shall be visible in the directory tree on the left-hand side of the display directly below the incident tree. Pop-up menus for administering these incidents and categories shall be accessible using the right mouse button. Selecting an instrument shall enable the status screen, displaying the instruments properties, and enable the live functions and toolbar.
- A status bar shall provide information about items over which the mouse pointer is currently positioned.

The software accessory shall provide menu features to manage and maintain the database of stored incidents other than those stored on the Intellex instruments.

- A status bar shall provide information about items over which the mouse pointer is currently positioned.
- A menu feature shall provide for creating, renaming and deleting databases.

- A menu feature shall provide for creating, renaming, deleting and moving incidents within the database.
- A menu feature shall provide for moving, deleting and renaming incidents.
- A menu feature shall provide for exiting the program.

The software accessory shall provide menu features that allow the user to display or hide screen items.

- A menu feature shall display or hide the toolbar.
- A menu feature shall display or hide the status bar.
- A menu feature and toolbar button (when the toolbar is displayed) shall display or hide video information for the currently displayed video segment or incident.

The software accessory shall provide menu features to activate functions of the device.

- A menu feature shall provide for retrieving alarms by instrument, cameras, time and date
- A menu feature shall provide for retrieving video by instrument, camera, time and date.
- A menu feature shall provide for refreshing communications to those remote instruments listed in the remote instruments setup list.
- A menu feature shall provide for retrieving an instrument status when an instrument is selected.
- A menu feature shall provide for retrieving and changing an instrument's setup when an instrument is selected.
- A menu feature shall provide for retrieval and display of live video when an instrument is selected.

The software accessory shall provide menu features to configure the device.

- A menu feature shall provide for master timekeeping for all Intellex instruments and associated software devices on the network. If any messages are returned, they shall be displayed.
- A menu feature shall allow the operator to set the display configuration.
- A menu feature shall allow the operator to access the remote instruments setup list, where instruments can be added, deleted and edited by their name, IP address, communication ports and type.
- A menu feature shall provide for editing the device communication port.
- A menu feature shall provide for setting the default live camera settings, by image quality and motion sensitivity.

The software accessory shall provide menu features for information about the program.

- A menu feature shall provide access to help topics, which define the functions and operation of the program.

- A menu feature shall provide access to the version of the program.

The software accessory shall communicate with Intellex and associated software devices over a wide area, local area or dialup TCP/IP network.

- The software accessory shall connect with all Intellex units connected to the network at startup.
- A status bar shall indicate the number of Intellex instruments that are available to the accessory over the network.
- The user shall be able to access the status, setup and video of any Intellex unit on the network at any time.
- The user shall be able to list the Intellex instruments and define the communication parameters, including instrument name IP address, and communication ports.
- The accessory shall provide an automatic daily timekeeping function to synchronize the time on all Intellex and associated software devices on the network.

The software accessory shall provide for retrieval of live video from any Intellex (V2.1L) instrument active on the network.

- The user shall be able to select the instrument and display live video in a single window or a widow divided into 2x2, 3x3 or 4x4 windowpanes.
- The live 2x2, 3x3 or 4x4 windowpanes can display live video from any camera on any instrument that is active and on the network.
- The user shall be able to save window and windowpane view configurations by name and access these via drop down menu.
- Each live windowpane shall have a popup menu, accessed with a right mouse click, to access the settings for the pane, including the quality and sensitivity settings.

The software accessory shall provide for downloading alarm and video information from connected Intellex units.

- The accessory shall display a time estimate before downloading any information. The user shall be able to download a segment at this time, or at a later time or to select a smaller/larger alarm list or video segment(s).
- The user shall be able to download a list of alarm events from an Intellex unit, based on camera, and date/time search and alarm criteria. A list of events that meet the search criteria will appear.
- The user shall be able to select and download a video segment from the alarm list.
- The user shall be able to search for a non-alarm video segment on an Intellex unit, based on camera, date and time criteria, and then download it.
- The user shall be able to assign an incident name to the downloaded video segment and create a note for it (up to 1,024 alphanumeric characters, including spaces).
- The user shall be able to define the location to which incident(s) will be saved.

- The user shall be able to download a portion of a video segment and still save it.

The software accessory shall provide for reviewing downloaded video segments.

- The directory tree shall provide access to saved incidents.
- When an incident is selected, the first frame of video for that incident shall be displayed in the image display area to the right of the directory tree.
- During playback, the user shall be able to control playback direction and speed, and to pause image playback. The user shall also be able to display the incident full-screen.

A secondary toolbar shall provide tools to play back a video segment or incident displayed in the image area.

- The mouse shall control whether video is paused or playing back at a normal rate.
- A slide bar shall control the direction and speed of the playback. Sliding the bar to the right shall increase forward playback of video. Sliding the bar to the left shall play back video in reverse at varying speeds.
- The mouse shall allow the operator to go to the incident's first or last frame of video.
- A button shall expand the image area to fill the display.
- A button shall access a screen that allows the user to manipulate and enhance a selected frame of video, using a number of image enhancement tools. The user can enhance, sharpen, smooth, lighten or change the contrast on the image. Then the image can be saved to a separate file or a floppy disk and/or printed.

The software accessory shall maintain the integrity of the original data and video on the Intellex unit.

The software accessory shall be a Sensormatic Network Client™ RDVNCE-22L or equivalent.

C. Minimum Performance Specifications

The software accessory must be installed on a desktop computer that meets the following requirements:

CPU:..... Intel® Pentium® III MHz with MMX
Operating System:..... Windows® 98 Windows® 2000 or Microsoft® Windows NT® 4.0 Server or Workstation Service Pack 4 or higher
RAM: 128MB
Hard Disk: 40GB (recommended) free space
Other Drives: CD-ROM for software installation
Monitor: 800 x 600 resolution and capable of displaying 16-bit color (32-bit recommended)
Video Card:..... 8MB VRAM minimum, DirectDraw® support for Windows NT or the operating system used is recommended

June 07, 2002

Network Card:..... Must support 10BASE-T (10Mbps) and/or 100BASE-TX (100Mbps) operation and/or dialup modem; must match network configuration

Miscellaneous: Mouse or other 2-, 3-button, IR or track-ball pointing device. Parallel printer port for software key 104-Key Enhanced keyboard or equivalent

PART 3 - SECURITY MANAGEMENT CONTROL SYSTEM

3.01 MANUFACTURERS

Sensormatic Access Control Division C•CURE 800/8000 System

Sensormatic Access Control Division iStar controllers

3.02 SERVER CONFIGURATION

A. Minimum CPU Capacities

The Server CPU shall be 100% IBM compatible Pentium/Pentium III 1Ghz PC approved for running the Microsoft Windows NT operating system. The PC shall have the following *minimum* configurations dependant upon system capacities:

- 128 Mb RAM
- 500 MHz clock
- 60 GB hard drive
- 3.5" floppy disk drive
- QIC, DAT tape drive, or CD-RW drive
- CD-ROM drive
- 17" SVGA monitor (1024 x 768 resolution @ 65,536 colors)
- Two (2) serial, one (1) parallel ports
- PS/2 style mouse
- Windows NT 4.0 operating system
- Ethernet Adapter
- Display Adapter (1024 x 768 resolution @ 65,536 colors)
- 56.6K baud modem
- Capacities for the 8000 and 8000Plus Enterprise Systems

B. High Resolution Graphics

The system shall support a minimum of 200 user programmable color graphic map displays capable of showing the floor plan, location of alarm device, and alarm instructions. Floor plans shall be created in a .PCX or .BMP format and shall be capable of being imported from other systems. The system shall provide the ability to drop dynamic object icons onto the drawings.

These dynamic object icons shall allow the system operator to perform tasks/issue commands related to the object, by double clicking on the icon. All of the graphic maps are to be centralized in the system configuration and shall be displayed on the operator's workstations. Systems requiring separate display monitors or PC are not acceptable.

C. Information Storage

All programmed information as well as transactional history shall be automatically stored onto the server hard disk for later retrieval. The system shall warn the operator when the disk space allocation approaches maximum capacity. The system shall allow the system administrator to determine at what percentage of capacity the warnings shall be issued. The system shall further allow the system administrator to define the frequency at which the warnings shall be issued to system operators.

D. Information Backup/Retrieval

The Server CPU shall be capable of transferring all programmed data and transactional history to tape or floppy disk. All programmed data shall be restorable from disk and/or tape in case of system hardware failure.

E. Communications Rates

The system shall be capable of supporting a communication rate of 19,200 baud to all access control panels and 10MB Ethernet communications rates to client workstations.

F. Printers

The SMCS shall support report printers. The report printers may be connected to the parallel port of the Server or Client computers.

G. Mouse

The SMCS shall only utilize a mouse as the man - machine interface. The mouse shall be used throughout the application.

H. Communication Ports

Serial ports

The SMCS shall be able to support multiple serial devices. In addition to COM1 and COM2, up to [8, 16, 32, to 256] additional ports may be configured through the use of a port expander as manufactured by DigiBoard® or equal. These serial ports may be used for connection to iStarfield panels, modems and CCTV matrix switchers.

The SMCS shall support up to two hundred and fifty six ports for communication to the apC/8Xs. A maximum of [16, 32, 128, 256] apC/8Xs may be configured per system. In a hardwired configuration up to sixteen (16) apC/8Xs may be configured per line.

I. Network ports

The SMCS shall support the use of Ethernet networks as the communications path between the host computer and field devices such as modems, iStar and CCTV matrix switchers. This communications path shall be the same network used for communications between the host server and the operator workstations. The communications between the host computer and the field devices shall be

encapsulated in a TCP/IP network/transport layer. In a dedicated network configuration, up to six (6) apC/8Xs may be configured per line.

J. Port name

Each communications port shall be addressed with the system by a unique twenty (20)-character user defined name. The use of code numbers or mnemonics shall not be accepted.

K. Port description

The system shall provide the ability to add a communication port description to each port configuration. There shall be no limit to the amount of text that can be used to describe the communications port.

L. On-line/Off-line

The system shall allow the operator to put a communications port on-line or off-line. If the communications port is placed off-line, the system shall not use the port to communicate to field devices configured on that port. If the communications port is put on-line, the system shall use the port to communicate to field devices configured on that port.

M. Communications failure

If the communications port is on a network device, such as a terminal server, the system shall indicate if there is a loss of communications to that network address. All field units connected to that network address should also be reported as being in communications failure.

To allow for network delays, the system shall allow the system administrator to define a wait time before annunciation of a communications failure. The wait time shall be from zero (0) to ninety-nine (99) in one-tenth (1/10) second increments.

The system shall provide the administrator the ability to set a reconnect retry period. This is the time period the system shall wait before attempting to re-establish communications with a network port which is in communications failure. The reconnect retry period shall be from zero (0) to ninety-nine (99) in one-tenth (1/10) second increments.

Configuration of the remote communications port characteristics, i.e. baud rate, parity, error-checking etc. shall be done either on the network device or through network management tools. This configuration is not required to be executed by the Security Management Control System.

N. IP address

For communications ports on a network device, the system shall allow the operator to define the IP address of the device, as well as the local port address, to which the remote field devices are connected.

O. Encryption

It shall be possible to configure a system such that the communications between the Host computer and the iStar panel or iSTAR controller is encrypted.

P. Redundant Array of Independent Disks (RAID)

The system shall support a redundant array of multiple independent hard disk drives (RAID) that provide high performance and fault tolerance. The RAID array shall appear to the host computer as a single storage unit or as multiple logical units.

RAID 1

The system shall support the use of RAID level 1. RAID level 1 provides complete data redundancy.

RAID 5

The system shall support the use of RAID level 5. RAID level 5 includes disk striping at the block level and parity.

Q. Symmetric Multiprocessor (SMP) Support

The system shall have the ability to support two or more processors in one PC.

R. Redundancy

Through the use of third-party software and associated hardware, the system shall support a second server for redundant capability. During normal operation, data shall be written to either server and shall be mirrored to its counterpart in a bi-directional mirroring process.

If a failure is detected, it shall be verified across both the network and the mirrored data links. When the failure has been verified, the surviving server shall assume the functions and identities of the failed server without having to sacrifice its own identities or functions. Applications originally running on the failed server are restarted on the surviving server.

3.03 OPERATOR WORKSTATIONS

A. Minimum CPU Capacities

The Operator (Client) workstation(s) shall be 100% IBM compatible Pentium III 1Ghz PC approved for running either the Microsoft Windows NT 4.0, Windows 95 or Windows 98 operating systems. The PC shall have the following minimum configuration:

- 64Mb RAM
- 500 MHz clock
- 20GB hard drive
- 3.5" floppy disk drive
- CD-ROM drive
- 17" SVGA monitor (1024 x 768 resolution)
- Two (2) serial, one (1) parallel ports
- PS/2 style mouse
- Windows NT Workstation V4.0 or Windows 95/98 operating system
- Ethernet Adapter
- Display Adapter (1024 x 768 resolution @ 65,536 colors)

B. Local Area Network

The SMCS shall be a Client/Server or Host/Controller architecture configured to operate in a local area network environment. The SMCS Server may be accessed by up to twelve (12)

Operator workstations at any time. The network shall be capable of supporting the TCP/IP protocol.

3.04 PRINTERS

A. Supported Printers

The system shall support as a report printer(s) any printer for which a printer driver exists within the Windows NT/95/98 operating system. These printers may be dot matrix impact printers, ink jet printers or laser printers.

Real time activity printers shall be form-based printers, i.e. dot matrix. Laser printers shall not be used as real time event printers.

B. Shared Printers

The system shall provide the ability to generate reports to printers. The printers may be connected to the parallel port of the client and server workstations. The printers shall be configured as shared devices, allowing reports to be generated to any system printer, from any client workstation. The system shall provide the hardware and software support for spooled report printers, at the users option. When configured, the report printer(s) shall be driven from a print queue that is internally maintained by the system software in a manner transparent to the system operator. Once the report has been queued to the spooler, the operator's terminal shall be released to perform other functions.

C. Laser Printer

At a minimum, the laser printer shall be a parallel printer interface, have a 4 pages per minute print rate, and 2MB memory.

3.05 SOFTWARE

A. Software Capacities

System software and language development software shall be existing, industry accepted, and of a type widely used in commercial systems. Operating system shall be multi-user/ multi-tasking capable of operating in a non-proprietary CPU. The application software, substantially as offered, shall be written in a high level, industry standard programming language. The system shall be modular in nature, allowing the system capacities to be easily expanded without requiring major changes to the system operation and maintaining all defined system data as well as historical information.

All System functions shall be accessible via point and click mouse control. Systems requiring command string control or complex syntax are not acceptable.

The system software shall include the following features and be configured for minimum:

- Two hundred fifty six (256) readers
- ten thousand (10000) active card holder records
- four (4) simultaneous programming locations
- nine hundred-ninety nine (999) client PC's definable on Server

- supporting up to seventeen (17) simultaneous printers
- one hundred twenty eight (128) time schedules
- thirty two (32) programmable holidays
- Number of Assets [800/1 NA] [800/5, 800/10 40,000] [800/20 = 250,000, 800/30 = 250,000, 800/40 = 250,000, 8000 Enterprise System = 500,000]
- two thousand (2000) clearance codes
- twenty five hundred (2500) input points
- one thousand twenty four (1024) output control points
- forty thousand (40,000) operator accounts with unlimited definable privilege levels
- audible alarm annunciation at Operator workstation
- unlimited graphic maps to be displayed on the Operator workstation monitor
- multi-user, multi-tasking operating system
- dial up remote diagnostics
- event scheduling
- an unlimited number of user defined card holder data fields
- an unlimited number of door groups
- an unlimited number of areas
- card holder access privilege activation date and time
- card holder access privilege expiration date and time
- Americans with Disabilities Act (ADA) compliance in door and access operation
- serial interface with CCTV matrix switchers
- field panel communications through various means including hardwired, dial-up and Ethernet network
- capacities for the 8000 Enterprise System

B. Software Operation

The system shall provide a top down configuration methodology. Top down programming shall allow the system operator to configure the system software and hardware configurations in a logical flowing method. The system should allow the operator to start at the highest configuration level of the system and then move down through the lower configuration levels without having to move back and forth between a variety of menus.

The configuration tools shall utilize intelligent configuration controls. The system shall be structured such that the operator shall not be able to perform configuration functions that are not valid based upon the configuration used. For example, if a two (2)-door field control panel is being configured, the system shall not allow the operator to configure door number three (3) on that panel.

Where the operator may be presented with a choice of pre-defined objects, the system shall provide a pop-up pick list. The operator may choose an object in the listing by double clicking on

June 07, 2002

the item. If the object has not been pre-defined, the operator may define the new object from the pop-up pick list.

The system shall utilize dynamic icons. The dynamic icons shall change appearance, in both color and icon display based upon the status of the associated object. This appearance change shall occur in real time and shall not require the system operator to perform a screen refresh or exit the current screen.

Dynamic icons shall be provided to represent:

- intelligent field panels
- door lock control
- alarm input
- output control relay
- system/alarm event
- manual operator actions

For intelligent field panels hard wired to the host computer, the dynamic icons shall reflect the true state of the device represented by the icon. If an operator issues a command to unlock a door, and the field panel, which controls that door, is not in communication with the host computer, the icon shall not change state or appearance.

Where certain data fields within data screens may contain the same information, the system shall provide the ability to define default settings for these data entry fields. The operator shall be able to change the default setting without impacting objects that have already been defined.

C. Millennium Compliance

The application software, computer operating system and the field panel-operating program shall be millennium compliant. Millennium compliant means the operating systems and programs shall be able to distinguish the year 2000 and beyond and perform control functions based upon dates in the year 2000 and beyond. Provide documentation indicating the Security Management Control System application, computer operating systems and field panel operating programs are all millennium compliant.

D. Open Database Connectivity

The Security Management Control System shall utilize a database engine, which is Open Database Connectivity (ODBC) compliant. This database engine shall be compatible with 32 bit ODBC drivers. The system shall allow the ability to perform ODBC writes to the system database to import personnel data directly into that database. This data shall then be automatically downloaded to field devices in the same way as manually entered information. See Automated Personnel Data for details.

The software manuals for the Security Management Control System shall provide complete documentation outlining the database schema used within the system. This documentation should be sufficient to allow a person, moderately skilled in databases, to extract information from the Security Management Control System's databases. The database schema information shall include information on the personnel tables, history and configuration tables.

June 07, 2002

It shall be possible to use third party report tools, such as Crystal Reports, to generate reports not already provided by the Security Management Control Systems, such as statistical or graphical reports of system activity.

E. ODBC password protection

Database level Username and Password protection shall be provided for ODBC users. ODBC users will be required to supply a Username and Password when they connect to the SMCS database. Usernames and passwords shall be configured via the user configuration functionality currently available in the Administration utility.

F. Language Localization

The system shall be configured such that the information presented to system users and operators may be displayed in a language that may be native to the system operator.

G. Supported languages

It shall be possible to translate the English text into all languages supported by the ISO-8859-1 (Latin-1) code page. It shall be possible to translate the product into other supported languages, including double-byte languages, but translation will need to be coordinated with the product manufacturer.

I. Simultaneous languages

The information presented to a system operator shall be presented in the language defined in the operator profile. If multiple operators are connected to the host server, the information shall be displayed in the language defined in their profile.

All system-generated text shall be displayed in the language defined in the operator profile. Data entered by a system operator, such as a Door name, shall be displayed in the language used for entering the data.

Messages generated by the system will be displayed in the language set in the International control panel of the server operating system.

Reports generated by the system shall be displayed in the language defined during the report generation. When generating a report, the operator shall be able to select from a predefined list, the language to be used when generating the report.

J. Date format

The system shall support the date being formatted in DD/MM/YY or MM/DD/YY, depending upon local date formatting.

K. Card reader LCD panels

The system administrator shall be able to define the language and date format that shall be used for display of messages on reader LCD panels.

3.06 HARDWARE DEFINITIONS

A. Menu configuration

The System software shall allow for the configuration and programming of the iStar through the use of simple menu commands. The menu commands may be executed by keystroke and mouse point/ click control.

B. Memory

The allocation of memory, between cardholder records and historical event buffering, within each iStar shall be dynamic. Any memory not being used for the storage of cardholder records shall be available for the buffering of historical events.

C. Database updates

The system software shall download/upload information to/from the iStar automatically while the controller is in communication with the host CPU. A data download shall also be automatically initiated when a controller returns from a communications fault.

D. Serial Ports

All serial ports shall be configured from an easy to follow menu. Systems requiring in depth knowledge of the operating system or CMOS setup for port configuration are not acceptable.

E. Expansion

System expansion must be modular. Additional apC/8Xs required for incremental system expansion shall be available in two (2) and eight (8) door configurations to allow for maximum installation flexibility and optimum cost.

3.07 TIME SPECIFICATIONS

A. Addressing

Each time specification shall be addressed within the system by a unique twenty (20)-character user defined name. The use of code numbers or mnemonics shall not be accepted.

B. Holidays

The system software shall allow a minimum of thirty-two (32) holidays. Holidays shall be considered as additional days of the week and shall have different user programmable parameters from the normal designations for that day. The system shall provide the ability to designate two (2) types of holidays, allowing certain segments of the system to be under holiday control, while other segments of the system are under normal time controls. The system shall allow the holiday to be addressed within the system by the twenty (20) character user defined name assigned to that holiday, i.e. New Year's Day, can be addressed as New Year's Day. The use of code numbers or mnemonics in place of the holiday name shall not be accepted.

C. Configuration

Each time specification shall be comprised of user defined time segments. Each time segment shall be day(s) of the week, to include holidays, and a starting time and an ending time. The system shall provide grouping of days, i.e. Mon. - Fri, for easy system configuration.

D. Set-up

The system software shall have the capacity for a minimum of one hundred twenty eight (128) user programmable time specifications. Each time specification shall be comprised of allow a minimum of eighteen (18) individual time segments.

E. Assignment

The system shall allow a time specification to be assigned to:

- Access Control Clearance
- Inputs

- Outputs
- Doors
- Scheduled functions
- Alarm events

F. System usage

Events shall be used throughout the system to allow the system to react to system activity. For instance an event may be activated based upon an alarm point going into an alarm state. Events shall merge the links to actions, annunciation, communications port failure and timed activation capabilities into one component. An event shall perform multiple functions determined by the actions the user associates with it.

G. Event priority

The system shall provide four (4) priority levels; Critical, High, Medium, Low. Each priority level shall include a range of fifty (50) event priorities, thereby providing two hundred (200) event priorities. The system shall allow the operator to choose an individual priority or one of the four priority levels.

H. Configuration

The system shall allow an event to be configured to:

- require or not require operator acknowledgment
- not be cleared unless a log message is entered by the system operator responding to the event
- display or not display the event activation
- require the point(s) causing the event activation to reset before the operator may acknowledge the event.
- display a user defined text message (80 characters) upon event activation
- display a user defined text message (80 characters) when event is deactivated
- be associated to a map so the map opens automatically on the Monitoring Station when that event activates
- configure an event so that if it activates and is unacknowledged for a specified period of time, a second event is activated
- allow the user to associate an audio wave file with an event

I. Event instructions

The system shall allow the user to define event instructions that shall be displayed to the system operator when responding to an event activation. There shall be no limit to the amount of text that may be included in the event instructions.

J. Action list

The system shall allow an event to be configured to cause other system actions to occur. These system actions shall include:

- lock door(s) and/or door group(s)
- unlock door(s) and/or door group(s)
- momentary unlock of door(s) and/or door group(s)
- secure door(s) and/or door group(s)
- activate reader(s)
- deactivate readers(s)
- activate event(s) and/or event group(s)

- deactivate event(s) and/or event group(s)
- arm event(s) and/or event group(s)
- disarm event(s) and/or event group(s)
- arm alarm input(s) and/or input group(s)
- disarm alarm input(s) and/or input group(s)
- activate output control relay(s) and/or output control relay group(s)
- deactivate output control relay(s) and/or output control relay group(s)
- momentary activate output control relay(s) and/or output control relay group(s)
- activate CCTV action
- automatic display of an associated map on a Monitoring Station
- activation of a second event if the associated first event remains unacknowledged for a specified period of time
- activation when controller reaches a user-specified capacity (i.e. 90% full)
- activation when a controller reaches capacity overflow

K. Graphic map display

The system shall allow a graphic map display to be linked to an event. This graphic map shall be available to the system operator to display when responding to the event activation. Graphical maps shall be centralized in the network on a shared disk and be available for display on all operator workstations.

L. Automatic graphic map display

The system shall allow for the *automatic* display of a graphic map linked to an event. This graphic map shall be available to the system operator to display when responding to the event activation. At the Monitoring Station, when an event is configured to automatically display a map, a map will pop up each time the event is activated. The map will disappear when the event is acknowledged. Graphical maps shall be centralized in the network on a shared disk and be available for display on all operator workstations.

3.08 DOOR DEFINITIONS

A. Door alarms

The system shall allow each door to be configured to cause a variety of events to occur based upon activity at that door. The events may be caused by each of the following activities:

- door held open
- door forced open
- reader duress
- reader communication failure
- admit access
- reject access attempt
- visitor card admit access
- visitor card reject access
- noticed card admit access
- noticed card reject access
- passback violation
- PIN required

- tamper
- admit causes CCTV action
- reject causes CCTV action

B. Output Activation

The system shall allow each reader to be configured to cause an output to activate based on activity at that door. The following events may cause an output to activate:

- Output activation during reader communication failure
- Output activation while tampered
- Alternate shunt relay
- Shunt expiration relay

C. Duress alarm

The system shall allow a person at a card reader controlled door to signal the system operator that they are entering the area under duress. This duress alarm should not be evident at the card reader. The access controls normally executed by the system, person is authorized for that door, at that time and that day of the week, shall still be enforced for a duress access event.

D. Additional alerts

The system shall also generate alerts for the following:

- Enclosure tampering
- controller communication loss
- Reader tampering
- Reader communication loss
- Alarm tampering (supervised)
- AC power loss
- Low battery

E. Alarm supervision

When using supervised alarm points, the system shall monitor for Open Circuit, Short Circuit, in addition to Normal/Abnormal conditions.

3.09 OPERATORS

A. Password

The system software shall be capable of identifying up to forty thousand (40,000) system operators. Passwords shall be up to twenty (20) characters.

B. Operator name

Each operator authorized to operate any portion of the system shall be addressed within the system by a unique twenty (20)-character user defined name. The use of code numbers or mnemonics shall not be accepted. The operator name will be used throughout the system to identify commands and functions that the operator has executed.

C. Operator activity

All commands issued by a system operator while monitoring system activity including locking/unlocking doors, event acknowledgment, etc. shall be stored in the historical archive for later recall. The archived command shall include the operator name, time and date the command was issued and the command issued by the operator.

3.10 OPERATOR PRIVILEGES

A. Privilege control

Each operator shall be assigned an operator privilege level. Operator privilege levels define the individual commands within the system, which the operator is authorized to execute.

Only those commands which an operator is authorized to execute will be available to that operator. If the operator is not authorized to execute a command, that command will be disabled in the displayed toolbar.

B. Privilege level

The system shall provide the ability to group similar privilege controls into a defined privilege level, which can be assigned to system operators.

Privilege levels shall be defined and assigned to provide different levels of controls within the system:

- (a) Configuration privilege - shall control what commands, generally related to system data, and operator may execute.
- (b) Event monitoring - shall control which objects within the system the operator can monitor and run reports against.

C. Privilege level construction

There shall be no limit to the number of privilege levels that can be defined in the system.

Each privilege level shall be addressed within the system by a unique twenty (20)-character user defined name. The use of code numbers or mnemonics shall not be accepted.

The system shall provide the ability to add a description text to each output control relay definition. There shall be no limit to the amount of text that can be used to describe the point.

The system shall provide the system administrator the ability to disable a defined privilege level. Any operator who has been assigned this privilege level will be prevented from issuing any commands within the system.

D. Administrative privilege level construction

When constructing the administrative privilege levels within the system, the operator shall assign each administrative command in the system to an assigned access right. These access rights classifications shall be:

- (a) No Access - the operator can not execute these commands
- (b) Read-Only - the operator can open the screen for viewing of defined data. The operator is prevented from making any modification or deletions to the defined data.
- (c) Create/Edit/Delete - The operator can create new objects, edit and delete existing object. The operator however, cannot edit the default object definition.

- (d) Full Access - The operator can create new objects, edit and delete existing object. The operator can also edit the default object definition. When building the privilege level, the system will provide the administrator with a listing of all the commands in the system. By default, all system commands will be assigned to the No Access access right classification. The administrator can then move the command to the appropriate access rights classifications.

E. Monitoring privilege control construction

The monitor privilege shall control which message types and specific objects an operator can view/control while in the event monitoring program. The monitoring privilege shall further control which message types and specific objects an operator may view while running historical journal reports.

The monitoring privilege shall also allow the System Administrator to administer access to manual actions and certain menu options of the Monitoring Station. These monitoring privileges shall restrict which security objects a user can control, and which manual actions the user can perform on those objects.

When constructing the monitoring privilege, the administrator shall select the message types the operator can view. These message types shall include:

- (a) operator log in/log out
- (b) card admitted
- (c) card rejected
- (d) operator log message
- (e) object state change
- (f) manual operator actions
- (g) system activity messages
- (h) system error messages
- (i) device activity messages
- (j) device error messages
- (k) asset general activity
- (l) asset authorized movement
- (m) asset unauthorized movement
- (n) asset attempted movement
- (o) asset location update

The system administrator shall then define the specific objects, i.e. doors, alarm inputs, outputs, field panels, etc. within the system an operator can monitor.

If the operator is not authorized to monitor an object, by extension, the operator shall be restricted from issuing manual commands against the object.

F. Privilege level assignment listing

The system shall provide a report listing of all operators who have been assigned a particular privilege level.

3.11 CARD RECORD DEFINITIONS

A. Card data

The system software shall allow for card numbers up to nine (9) digits.

B. User defined labels

The system shall allow a privileged system operator to specify field name, field type, field restrictions and whether or not a field is mandatory and/or enumerated. The system shall provide the operator the ability to view the card record layout, including the new labels, before the changes are put into use. The system shall provide the system operator the ability to make fields within the cardholder record not visible.

C. Card record layout

The system shall allow a privileged system operator to define the placement of the user-defined fields within the personnel data screen.

D. Personnel records

Personnel records shall be constructed to contain multiple pages of personnel data in system and user defined fields. The personnel data shall consist of a minimum of the following:

- (a) Card holder name
- (b) Encoded card number
- (c) Record ID number (system defined, operator view only)
- (d) Issue level
- (e) Ten (10) clearance codes
- (f) Personal Identification Number (PIN) code
- (g) Facility number
- (h) Activation date and time
- (i) Expiration date and time
- (j) Unlimited number of user defined fields
 - How many text fields (minimum forty (40) characters per field)
 - How many integer fields (numbers less than 32,767)
 - How many date fields (MM/DD/YY)
 - How many logical fields (selected/not selected)
- (k) Person type
 - Employee
 - None
 - Escort
 - Visitor
 - Contractor
- (l) Status flags
 - Card Expired
 - Card Disabled
 - Card Lost
- (m) Access Control Options
 - Activate Alternate Shunt (ADA) Relays
 - Activate Anti-passback Event
 - Notice Accesses
 - Asset Manager
- (n) First and last name of operator that performed last edit of the cardholder information. This shall be defined by the system and shall be view only to the operator.
- (o) Date and time last edit was performed on the cardholder information. This shall be defined by the system and shall be view only to the operator.
- (p) Stored image of the person

- (q) Stored signature of the person
- (r) Identification badge layout assigned to the person
- (s) Date last image was captured/saved
- (t) Date last identification badge was printed

E. Personal Identification Number (PIN) control

The system software shall provide controls such that the Personal Identification Number (PIN) field in the personnel record cannot be viewed by system operators. This restriction shall be enforced when viewing the record, running reports containing the PIN field and exporting cardholder data.

When the hidden PIN control is set, the PIN field in the card record shall be displayed as a series of asterisks or bullets.

The system shall prevent running a query to find a card record that matches a particular PIN code.

F. Clearance Codes

While the operator is editing a cardholder record, the system software shall provide a browser list of all defined clearance codes. The operator shall be able to assign up to ten of the clearance codes to the cardholder by moving the clearance code name from the defined list to the assigned list.

Controls shall be provided to assign a clearance code to the cardholder, remove an individual clearance code, and remove all assigned clearance codes from the cardholder.

The operator, if authorized, shall also be able to define/edit a clearance from the cardholder record screen.

G. Mandatory data fields

The system software shall provide a means whereby the system administrator may define certain user-defined fields in the personnel record as being mandatory. Personnel performing data entry on the cardholder record shall be required by the system to enter information in all field marked by the system administrator as mandatory.

H. Choice List fields

The system software shall provide a means whereby the system administrator may define certain user-defined fields in the personnel record as choice list fields. The system administrator shall be able to define the choice list and the values to be included in the choice list. The operator, when performing data entry, shall be able to choose one of the values defined in the choice list.

I. Card record import/export

The system software shall provide means for bulk loading and bulk editing of card records through the use of a data file generated from another source. The external file shall be an ASCII file in comma-delimited format.

The system shall also provide the ability to generate the same format file of existing card records, allowing the information in the system to be exported to other computers and applications. The system shall allow the user to select the card records that shall be included in the export file.

J. Query capabilities

The system shall provide a card holder selection list, allowing the system operator to choose individual cardholder records from the selection list. The selection list shall provide a quick sorting display of all cardholder records. The operator shall be able to set the sorting of the personnel list by:

- (a) card holder name
- (b) card number
- (c) first user defined text field
- (d) first user defined integer field

The system shall allow queries to be performed on any field or combination of fields within the cardholder record. The system shall allow the queries to be performed based upon partial entry of data in a field, i.e. entering FI in the cardholder name field shall return all records where the name begins with the letters FI.

K. Alternate Shunt / Assisted access support (ADA)

The system shall provide the ability to control a door for cardholders requiring assistance or an alternate shunt time. The system shall provide the ability to tag a card indicating the person requires and alternate shunt time. When the person presents their card at a door, and the person is authorized for that door, the system shall unlock the door as normal and shall activate a second output control relay, which may be used to control a door opening device. The shunt time for the door shall be extended beyond the normal shunt time (shunt period defined by system administrator in hh:mm:ss) allowing the person requiring the alternate shunt to pass through the door without generating an alarm.

L. Previous activity report

While viewing a cardholder record, the system shall provide the ability to review the previous activity of the cardholder. This shall be accomplished by pressing the "Previous Activity" button on the cardholder record screen. The system shall automatically perform a historical search for all previous access activity for the cardholder. This information shall be displayed to the system operator, with the ability to generate a report, either to a file or printer, while viewing the information.

M. Enabling a cardholder

The system shall provide the ability to designate a person as a "User" from the Edit Personnel Record screen's User tab. All other user information features shall be disabled until the Person is designated as a valid user. Once the person is designated as a user in the Personnel Record, the user will be required to supply a username and set the user password before exiting the screen.

N. User configuration screen tab

While the operator is editing a cardholder record, the system shall provide the ability to enable a user from the Edit Personnel Record screen's User tab once the person has been enabled.

O. Enabling Breakthrough

- (a) view defines for all non-partitioned Administrators what personnel fields a user will have read access to when editing a personnel record from a partition other than their own.
- (b) For a personnel browse or query, the result list will include personnel from all partitions that match the search criteria.

3.12 AUTOMATED PERSONNEL DATA IMPORT

A. Overview

The system shall provide a means to import personnel information from an external ODBC database other than import from a flat file. Additionally, the import shall execute in the background periodically to avoid the need to run the Administration application each time personnel data is to be imported. The import procedure shall also perform the necessary validity checking to prevent corruption of the C●CURE system personnel table.

B. Automated import name

Each Automated import shall be addressed within the system by a unique twenty (20)-character user defined name. The use of code numbers or mnemonics shall not be accepted.

C. Automated import description

The system shall provide the ability to add a description text to each automated import definition. There shall be no limit to the amount of text that can be used to describe the alarm point.

D. Query during time specification

The system shall provide the ability to enter a time specification in order to restrict automated import activity for an automated personnel data import.

E. Interval

The system shall provide the ability to designate a time interval in minutes and seconds before the next import query is run during the designated time specification. The system shall allow the option of keeping the automated import query option connected between import queries.

F. Import options

The system shall allow the user to specify how the records are retrieved from the external database during the automated process and the amount of detail the import activity log will display after an automated import is run.

G. Data Source(s)

The system shall allow the user to select from a list of external databases. It shall allow the user to enter a user ID and password if one is required by the external database.

3.13 CLEARANCE CODES

A. Definition

The clearance codes shall be the definition within the cardholder record, which controls when and where a person or vehicle is authorized to move within a protected area. The clearance code shall be a function of combinations of reader locations and time specifications.

B. Clearance names

Each clearance code shall be addressed within the system by a unique twenty (20)-character user defined name. The use of code numbers or mnemonics shall not be accepted.

C. Construction

The system shall provide the operator with pick lists of previously defined doors, door groups and time specifications. The system shall allow the operator to create a combination of a door or door group with a time specification. The system shall allow each clearance code to contain a minimum twenty four (24) door (group) and time specification combinations.

D. System usage

The clearance codes shall be available to the system operator as a pop-up list, while the operator is editing a cardholder record. The system shall allow a clearance code to be assigned to multiple cardholder records.

3.14 REPORTS

A. Data storage

All programmed and transactional history is automatically stored to the hard disk for later recall. Information written to the hard disk shall be immediately available for report generation.

B. System function

The system software shall be able to generate reports without affecting the real-time operation of the system.

C. Media

Reports shall be generated from the hard disk and generated to the operator's screen, hard disk, floppy disk or printer(s).

D. Search criteria

The database shall be structured such that the operator shall determine the search parameters based on variables available on the individual report menu. Systems requiring the user to type complicated search strings are not acceptable.

E. Report types

Programmed data reports shall be available for the following information:

- (a) Database configuration
- (b) Historical activity

F. Database configuration reports

The system shall be capable of producing reports of database configuration information. These database configuration reports shall include the following:

G. Hardware configuration

- (1) iSTAR controllers
- (2) Alarm inputs
- (3) Output control points
- (4) Readers
- (5) Communication ports
- (6) CCTV switcher
- (7) CCTV actions
- (8) CCTV protocol
- (9) Host modems

H. System configuration

- (1) Events
- (2) Doors
- (3) Holidays
- (4) Time specifications
- (5) Time zones
- (6) Clearances
- (7) Real time event printers
- (8) Administrative privileges
- (9) Monitoring privileges
- (10) Area
- (11) Elevator
- (12) Floor
- (13) Map
- (14) Node

J. Group reports

- (1) Door groups
- (2) Event groups
- (3) Input groups
- (4) Output control points
- (5) Area group
- (6) Elevator group
- (7) Floor group

K. Time zone report

- (1) Report of clearances with components in different time zones (time zone mismatch report)
- (2) Time zone report

L. Types of replay

- (a) Report activity log
- (b) Report audit log
- (c) Report both activity and audit logs

M. Activity Reports

Activity reports shall be available for the following:

- (a) Select personnel for report
- (b) Select message type for report
- (c) Select security items for report
- (d) Select assets for report

N. Audit Log Reports

Audit trail reports shall be available for the following based on all users or selected users:

- (a) Audit trail creations
- (b) Audit trail deletions
- (c) Audit trail modifications

O. Report Selection

Depending upon the type of report being generated by the system operator, the system shall provide a listing of previously defined reports. The operator shall be able to pick an existing report, modify an existing report or generate a new report.

June 07, 2002

P. System defined reports

The system shall contain pre-defined reports that shall report the database configuration for each of the following:

- (1) Area
- (2) Holidays
- (3) Time specifications
- (4) Time zones
- (5) Clearances
- (6) Elevator
- (7) Floor
- (8) Map
- (9) Node
- (10) Event
- (11) Door groups
- (12) Area groups
- (13) Elevator groups
- (14) Floor groups
- (15) Event groups
- (16) Input groups
- (17) Intrusion zones
- (18) Control output relay group
- (19) Time specification detail, which shall indicate all actions, clearances, input point, output points, etc. Which are affected by the time specification
- (20) Authorized cardholder report, selected by specific door, which shall report all cardholder who have access privilege through a defined door. The report shall indicate the door name, cardholder's name, card number, day(s) of the week and associated time of day, and clearance name.

Q. Report Creation

The system shall allow an operator to define reports and the contents contained within the report. There shall be no limit to the number of defined reports. Based upon the type of report being created, the system shall provide a pick list of items that may be included within the report. The reports that the operator shall be able to create and the fields that may be contained within these reports shall include:

R. apC/8X controllers

- (1) controller name
- (2) controller description
- (3) On-line
- (4) controller type
- (5) Address switch setting
- (6) Serial port
- (7) Poll period
- (8) Poll period while in communications failure
- (9) Poll time-out delay
- (10) Communications failure delay time
- (11) Time zone
- (12) Time spec
- (13) controller phone number

- (14) Connection type
- (15) Dial-up modems for unit
- S. Output control point
 - (1) Output name
 - (2) Output description
 - (3) On-line
 - (4) controller unit
 - (5) Related door/elevator floor
 - (6) Pulse duration
 - (7) Board
 - (8) Board type
 - (9) Normally energized
 - (10) Output type
 - (11) Slot index
- T. Intrusion Zone
 - (1) iStar name
 - (2) Armed output
 - (3) Arming input
 - (4) Arming method
 - (5) Arming tamper input
 - (6) Description
 - (7) Disarmed output
 - (8) Disarming input
 - (9) Disarming method
 - (10) Disarming tamper input
 - (11) Doors
 - (12) Entrance delay time
 - (13) Exit delay time
 - (14) General inputs
 - (15) Intrusion zone name
 - (16) Not armed event
 - (17) Online
 - (18) Time spec
 - (19) Violated input
- U. Input point
 - (1) Input name
 - (2) Input description
 - (3) On-line
 - (4) Controller unit
 - (5) Input type
 - (6) Activate event during time specification
 - (7) Activate event outside time specification
 - (8) Activate caused by supervision error
 - (9) Activation output
 - (10) Annunciate
 - (11) Armed
 - (12) Board

June 07, 2002

- (13) Board type
- (14) Slot index
- (15) Supervision error event
- (16) Supervision error output
- (17) Time spec

V. Event

- (1) Event name
- (2) On-line
- (3) Priority
- (4) Annunciates upon activation
- (5) Acknowledgment required
- (6) Acknowledgment clears alarm
- (7) Acknowledgment while event active allowed
- (8) Message to display when activated
- (9) Message to display when deactivated
- (10) Event instructions
- (11) Operator log message required
- (12) Name of graphic linked to event
- (13) Armed
- (14) Dial-up condition
- (15) Event name
- (16) Event map
- (17) Automatic map display

W. Door

- (1) Door name
- (2) Door description
- (3) Event caused by:
 - Admit
 - Reject
 - Noticed admit
 - Noticed reject
 - Visitor admit
 - Visitor reject
 - Held open
 - Forced open
 - Duress
- (4) Door switch monitor point
- (5) Door request to exit monitor point
- (6) Door latch relay
- (7) Door alternate shunt (ADA) relay
- (8) Shunt expiration relay
- (9) Alternate shunt time
- (10) Shunt expiration relay time
- (11) Reader 1
- (12) Reader 2
- (13) Unlock time
- (14) Shunt time
- (15) Pin entry required during time specification

June 07, 2002

X. Reader

- (1) Reader name
- (2) Reader description
- (3) On-line
- (4) Reader technology
- (5) controller to which reader is connected
- (6) Output control point linked to communication failure
- (7) Tamper triggers output
- (8) Tamper triggers event
- (9) Board
- (10) Board type
- (11) Card format 1
- (12) Card format 2
- (13) Card format 3
- (14) Pin required during time spec
- (15) Related door/elevator
- (16) Slot index
- (17) Time spec enabling pin
- (18) Type

Y. Communication port

- (1) Port name
- (2) Port description
- (3) On-line
- (4) Port type
- (5) Port time-out delay
- (6) IP address
- (7) Reconnection retry period

Z. Real time event printer

- (1) Workstation name
- (2) Printer description
- (3) Printer port identification
- (4) Page length
- (5) Page width
- (6) Privilege level
- (7) Abnormal status event
- (8) Initialization string
- (9) Header (left, center, right)
- (10) Footer (left, center, right)

AA. CCTV matrix switcher

- (1) Clock synchronization
- (2) Communications fail delay
- (3) Description
- (4) On-line
- (5) Poll period
- (6) Port
- (7) Protocol
- (8) Switcher name

June 07, 2002

- (9) Wait time
- (10) Time zone
- BB.CCTV action
 - (1) Action name
 - (2) Action type
 - (3) Description
 - (4) Parameters
 - (5) Switcher
- CC.Host modem
 - (1) Connect to host wait time
 - (2) Description
 - (3) Direction
 - (4) DTR off timer
 - (5) Initialization string
 - (6) Modem answer delay time
 - (7) Modem name
 - (8) Modem phone numbers
 - (9) Modem response wait time
 - (10) Modem status check time
 - (11) On line
 - (12) Port
 - (13) Re-dial/reconnect delay time
 - (14) Use DTR
- DD. Administrative privilege report
 - (1) Privilege name
 - (2) Privilege is enabled
 - (3) Description
 - (4) Commands by access right classification
- EE. Administrative privilege assignment report
 - (1) Privilege name
 - (2) Operator names assigned the privilege
 - (3) Personnel name of operators assigned the privilege
- FF. Administrative privilege user of screen
 - (1) Screen name
 - (2) Operator name
 - (3) Personnel name of operator
 - (4) Privilege level name
 - (5) Access right classification
- GG.Monitoring privilege report
 - (1) Privilege name
 - (2) Description
 - (3) Viewable message types
 - (4) Type and names of objects / object groups which can be monitored
- HH. Partition report
 - (1) Partition name

June 07, 2002

JJ. Users of monitoring privilege report

- (1) Monitoring privilege name
- (2) User names assigned the privilege
- (3) Personnel name of operators assigned the privilege

KK. Emergency roll call report

The emergency roll call report shall provide a listing of all personnel that the system has determined to be in a user-specified area. The emergency roll call report can be used in emergency evacuation situations, to determine if personnel are in the building, and where they are in the building. The emergency roll call report can be initiated by an event or run as a report by a system operator.

LL. Automatic generation

The system shall allow an emergency roll call report to be automatically generated based upon an event activation. The report shall be automatically generated to a pre-defined report printer. No operator interaction shall be required in order to generate the emergency roll call report.

The system shall allow the system administrator to define a delay period before the report shall be compiled. This delay period shall be set in MM:SS up to ninety-nine (99) minutes. Upon activation of the event, the system shall wait the defined delay period. After the delay period has passed, the system shall begin to compile the report. If the event that caused the generation of the emergency roll call report resets before the time period has expired, the report generation shall be automatically canceled.

MM. Activity duration

In order to ensure the emergency roll call report contains only current access activity, the system shall allow the system administrator to define a duration timer. Only events that have occurred within the period defined by the duration timer shall be included in the emergency roll call report. This duration timer shall be set on a system wide basis, and shall be in hour (HH) increments up to one hundred sixty eight (168) hours.

If a the duration timer is set to twenty four (24) hours and a person's last use of an access card, placed them in an area to be included in the emergency roll call report, two (2) weeks earlier, they would not be included in the emergency roll call report.

In order to use the emergency roll call report, the duration timer must be set to a value greater than zero (0).

NN. Report construction

Each emergency roll call report shall be defined by an authorized system operator and shall contain the following elements:

- (a) report name
- (b) area to be included in the report
- (c) up to six (6) fields from the card holder record
- (d) up to four (4) sort keys
- (e) reader last used
- (f) date and time of last access by individual
- (g) printer to which report should be directed
- (h) activation date

June 07, 2002

- (i) activate AP event
- (j) alternate shunt (ADA)
- (k) age
- (l) area used
- (m) asset administrator
- (n) badge layout ID
- (o) badge print date
- (p) card number
- (q) user defined character fields
- (r) user defined integer fields
- (s) date fields
- (t) logical fields
- (u) clearance fields
- (v) disabled
- (w) door used
- (x) expiration date
- (y) facility code
- (z) first name
- (aa) image capture date
- (bb) is user
- (cc) issue code
- (dd) last access date/time
- (ee) last modified date
- (ff) last modified person
- (gg) last name
- (hh) lost
- (ii) middle name
- (jj) noticed
- (kk) person ID
- (ll) person type
- (mm) PIN

OO. Performance

Based upon a system, under normal load, containing one thousand (1,000) card holder records, a duration period of forty eight (48) hours and fifty five thousand transactions per day, the emergency roll call report shall begin printing within five (5) minutes of the expiration of the duration timer. This five-minute requirement presumes that only one emergency roll call report is being generated and does not include the time required to print the actual report.

PP. Administration program

It shall be possible to generate an emergency roll call report from the administration program, as well as the automatic generation based upon event activation. The operator shall generate the report from the administration program, as they would any other system report.

QQ. Media

Reports shall be generated from the hard disk and generated to the Monitoring Station's screen or printer(s).

3.15 AUDIT TRAIL

A. General description

The system shall provide an audit trail function that is intended to record all permanent changes in data configured by system operators. The audit trail shall record permanent changes made to the configuration database by manual operator data entry, import/export or other system controlled devices, such as portable data entry devices. Temporary changes, such as running a report, and querying the cardholder database need not be recorded by the audit trail function. Changes made to the system database, outside of the Security Management Control System application, such as using ODBC tools; do not need to be recorded by the audit trail function.

B. Modification details

The audit trail function shall record and report the following information:

- (a) date/time change occurred, this shall be the date and time the change was effected and saved to the database. If the operator was several layers into the programming, this shall be record as the date/time when the OK button on the outermost screen was pressed. For example, if the operator changed 20 different objects all on the same iStar screen, none of those changes would become final until the operator selected OK on the iStar screen. All these changes would have the same date/time stamp in the audit trail.
- (b) type of object being changed, this would be personnel record, door, input, reader, apC/8X, iSTAR, communications port, etc.
- (c) name of the object being changed
- (d) type of change, being the object was created, modified or deleted
- (e) full name of the person making the change, reported as last name, first name, as recorded in the personnel record
- (f) method used to change the data, being manual edit, import or portable data entry device.

B. Audit trail storage

All database modifications recorded by the audit trail function shall be stored in the historical journal, and shall be available for selective searching, reporting and replaying.

C. Audit trail report

Audit trail reports shall be conducted using the standard report tools provided by the Security Management Control System.

When generating an audit trail report, the operator shall be able to:

- (a) select whether the audit trail information is to be included in a historical transaction report or run as a separate report
- (b) select the changed personnel records which are to be included, allowing an audit trail report on changes to all personnel records, or only selected personnel records
- (c) select the changed security items to be included in the report. These shall be the same security items as used in the historical activity report
- (d) set the time parameters during which changes to the database shall be included in the report
- (e) select the type of change, whether the change was a creation, modification and/or deletion, to be included in the report
- (f) select the operator who made the change, allowing an audit trail report on changes made by all operators, or only selected operators

June 07, 2002

All audit trail messages, generated from a single transaction shall be reported as a group in an audit trail report.

3.16 GRAPHICS

A. Graphics file format

The system shall allow graphics and floor plans floor plans to be linked to points and events within the system. These graphics and floor plans shall be configured in a .BMP or .PCX format to allow for the importation of existing drawings.

B. Programming

The system software shall, through the use of a mouse, allow for placement of device icons on each graphic/ floor plan. The device icons, which may be placed on the graphic/ floor plan, shall include:

- (a) alarm inputs
- (b) output control points
- (c) doors
- (d) other graphics

C. Operation

Upon activation of a selected event, the operator shall, by the use of a single keystroke, view the associated graphic/floor plan on the monitor. The operator shall use the mouse to click on any of the icons on the graphic and issue a command associated with the icon. Systems requiring a separate monitor or PC for the display of alarms or floor plan graphics are not acceptable.

D. Storage

The graphics feature shall take advantage of the Client/Server system configuration, with all graphics being created/stored on a shared disk in the network. These graphics shall be available to all authorized Operator workstations.

E. Real Time Event Printer

The system shall support real time event printers. These printers shall be connected to the parallel port of an operator workstation. A maximum of one (1) real time event printer shall be connected to each operator workstation.

Real time activity printers shall be form-based printers, i.e. dot matrix. Laser prints shall not be used as real time event printers.

F. Printer operation

The real time event printer shall automatically start, upon the connection of the workstation of the operator workstation application to the host computer. Other than starting up the workstation application and logging in, no operator interaction shall be required in order to start the real time event printer.

The operator shall be able to issue a command to manually stop the real time event printer. This command shall require the operator to verify they shall be stopping the real time event printer.

An event message shall be generated to the historic activity file whenever a real time event printer is started and/or stopped.

June 07, 2002

G. Page configuration

The system shall allow the system administrator to define the configuration of each page. This shall include the page length and page width.

The system administration shall also be able to define the header and footer information to be included on each page. It shall be possible to configure the header and footer information to contain user-defined text, current date, current time, and page number (starting when printer was started up).

The system shall allow the system administrator to separate the information contained within the header and footer by placement; left, center, and right.

H. Port configuration

The system shall further allow the system administrator to define a printer initialization string, which shall be sent to the printer, when the real time event printing is started up.

The system administrator shall define the privilege level assigned to the real time event printer. The privilege level shall control the segmentation of event messages, defining which events are directed to the real time event printer.

I. Printer errors

The system administrator shall be able to define an event that shall be generated in the event the real time event printer reports a malfunction. This event shall be generated when the printer reports, out-of-paper, printer off-line, paper jam, or other error.

To allow for changing of paper, clearing paper jams, etc. the operator workstation shall buffer a minimum of two hundred fifty (250) event messages. When the printer is returned to normal operation, the printer shall print all event messages in the buffer.

Printer errors shall be reported to the host computer and logged to the historical activity file.

J. Event messages

The event messages generated to the real time event printer shall be similar to the event messages generated to the operator workstation. The messages generated to the real time event printer do not need to contain the event icon, nor does the printer need to support of event message coloring.

Event messages shall automatically wrap at eighty (80) characters. Event messages shall be orphan controlled, such that a single event message is not split across multiple pages.

The real time event printer shall distinctly print event activation messages. Each event activation message shall be offset on the line and begin with double asterisks (**).

K. apC/8X and iSTAR Firmware

The controllers connected to the Security Management Control System shall utilize Flash ROM for storage of the operating program used to run the controller. It shall be possible to download the controller's operating program directly from the Security Management Control System. The system should not require a technician to physically change the ROMs on the controller in order to change the controller's operating system.

3.17 CLOSED CIRCUIT TELEVISION SUBSYSTEM

A. General

The Security Management Control System shall provide RS-232 serial interface(s) to closed circuit television (CCTV) matrix switcher(s). This interface shall allow the Security Management Control System to send commands to the CCTV matrix switcher in reaction to events occurring on the security management system.

It shall be possible to connect multiple CCTV matrix switchers to the security management host computer. The interface to the matrix switchers shall support matrix switchers from multiple CCTV manufacturers. The system shall provide simultaneous support for matrix switchers from different CCTV manufacturers.

Each matrix switcher shall be configured, i.e. camera names, monitor names, sequences, salvos, alarms and alarm actions, etc. utilizing the configuration program and tools provided by the matrix manufacturer.

3.18 MATRIX CONFIGURATION

A. Matrix switcher name

Each matrix switcher shall be addressed within the system by a unique twenty (20) character user defined name. The use of codes or mnemonics identifying the matrix switcher shall not be accepted.

B. Matrix switcher description

The system shall provide the ability to add a matrix switcher description text to each switcher definition. There shall be no limit to the amount of text which can be used to describe the matrix switcher.

C. Communication port

The system shall provide the ability to define the serial port through which the system communicates to the matrix switcher. This serial port can be any hardwired communication port, either on a port expansion device, i.e. COM1, COM2, COM3, etc. or a remote serial port on a network device.

D. Device protocol

The system shall provide the ability to define the protocol which is used in communication with the matrix switcher. The protocol used can be one of the pre-defined or user defined protocols.

E. Clock synchronization

In order to ensure the clocks on both the security and CCTV systems remain synchronized, it shall be possible to configure the security system to download the time to the matrix switcher. This time synchronization shall occur every hour on the half hour.

F. Communications loss

The system shall provide a mechanism whereby the security host computer shall periodically poll an on-line CCTV matrix switcher to ensure the matrix switcher is operational and the communications link is intact. This shall be accomplished via a poll/response scenario. The system shall allow the system administrator to define the poll period in MM:SS. If the matrix switcher fails to respond to a poll or other

June 07, 2002

command from the security management host computer, a communications loss message shall be generated and displayed on operator workstations. This shall only be enforced for those matrix switchers which support polling from a host computer.

G. Protocol definition

The system shall be pre-configured with protocols to support communications to matrix switchers from American Dynamics, Burle/Phillips, Pelco and Vicon.

In addition to these pre-defined protocols, the system shall allow the system administrator to define protocols to support matrix switchers from other manufacturers.

It shall also be possible for the system administrator to modify the pre-defined protocols to accommodate protocol changes which may have been incorporated by the matrix manufacturer.

Each protocol definition shall include:

- (a) protocol name - an unique twenty (20) character user defined name. The use of code numbers or mnemonics to define the protocol name shall not be accepted.
- (b) protocol description - an user defined narrative description of the protocol. There shall be no limit to the amount of text which can be used to describe the protocol.
- (c) command strings - the actual commands which are sent to the CCTV matrix switcher and the expected response from the switcher to the host computer upon receipt of the command string. The defined command strings shall include:
 - (1) initialization
 - (2) poll
 - (3) set date/time
 - (4) camera call up - to include camera and monitor numbers
 - (5) camera call up with preset - to include camera, preset and monitor numbers
 - (6) salvo call up - to include first monitor number and salvo number
 - (7) sequence call up - to include monitor and sequence number
 - (8) unload sequence
 - (9) activate alarm - to include CCTV alarm number
 - (10) deactivate alarm - to include CCTV alarm number
 - (11) set alarm title - to provide access request and cardholder information to American Dynamics screen

H. CCTV Actions

In response to system activity or based upon operator command, the Security Management Control System shall send commands to the CCTV matrix switcher indicating the command the matrix switcher shall execute.

I. CCTV action name

Each CCTV camera action shall be addressed within the system by a unique twenty (20) character user defined name. The use of codes or mnemonics identifying the CCTV action shall not be accepted.

J. CCTV action description

The system shall provide the ability to add a CCTV action description text to each switcher definition. There shall be no limit to the amount of text which can be used to describe the CCTV action.

K. CCTV action command

The commands sent by the Security Management Control System shall include:

- (a) camera call up
- (b) camera call up with PTZ preset
- (c) salvo call up
- (d) sequence call up
- (e) activate alarm
- (f) set alarm title

L. On-line/Off-line

The system shall allow the operator to put a CCTV action on-line or off-line. If the CCTV action is placed off-line, the system shall not use the CCTV action in response to events and operators shall not be able to manually activate the defined action.

3.19 MATRIX OPERATION

A. Event controlled

The system shall allow CCTV actions to be linked to system events and under automatic control of the system. For example, when a duress button is activated, the Security Management Control System shall automatically switch a defined camera to a defined monitor and pan that camera to allow viewing of activity in the general vicinity of the duress button location. No operator interaction shall be required in order for this switching and positioning to occur. There shall be no limit to the number of camera actions which can be linked to a single event.

B. Operator controlled

Within the event monitoring workstation, a system operator shall be able to manually activate/deactivate / pulse a CCTV action. The system shall provide a pull down list of all defined and on-line camera actions and the operator shall be able to choose an action from the list and issue an appropriate command.

C. Priority

CCTV actions shall become active or inactive according to the same priority rules that apply to other objects under the control of the Security Management Control System. A monitor related action shall be sent to the monitor whenever it becomes the highest priority action for that monitor. The system displays the CCTV action based upon the assigned priority. The system shall not wait for operator interaction, other than clearing a higher priority alarm, in order to activate the camera action.

D. Reports

The system shall allow the system administrator to generate reports indicating configuration of the CCTV switcher, CCTV actions and CCTV protocols.

3.20 VIDEO IMAGING SUBSYSTEM

A. General

The Security Management Control System shall be extensible to include an embedded Video Imaging Subsystem.

June 07, 2002

By use of the term embedded, it is the specifier's intention that the video imaging system be completely encapsulated within the Security Management Control System. The video imaging subsystem shall share a common database with the Security Management Control System, adding only the necessary data elements such as stored image and assigned badge type. The user interface shall be constructed to be similar in look and feel to the other modules of the Security Management Control System.

B. Hardware/Software Requirements

The Video Imaging subsystem shall operate on the same Client/Server architecture as the Security Management Control System. Images shall be stored in a central location (server) and shall be available to all authorized operator workstations (clients). All hardware components/modules shall be commercial off-the-shelf products offered by recognized industry manufacturers. Systems utilizing proprietary hardware shall not be acceptable.

The Server computer system may be the same server computer system utilized by the Security Management Control System or a dedicated image server of similar configuration.

The operator workstations shall be available in two (2) different configurations. One configuration for image viewing and another for image capture/printing.

The image viewing workstation shall be the same PC configuration utilized as the client workstation in the Security Management Control System. No additional computer hardware, i.e. video graphics cards, etc. shall be necessary in order to retrieve and/or view stored images.

In addition to the hardware and software specified elsewhere for the operator workstations, the image capture workstation shall include an image capture/camera control board, camera, flash and imaging printer.

C. Image capture/camera control board

The image capture board shall be a single-slot, high performance, PCI bus accelerated, 24bpp true-color Super VGA frame grabber designed to capture and display high quality video images. The image capture card shall contain a minimum 2MB DRAM. The image capture board shall provide a complete set of camera control functions required for capturing high quality video images. Video shall be captured by connecting an NTSC or PAL video source to the capture board's composite or S-Video input. The capture board shall be capable of displaying live video in a window. Software adjustable controls (hue, saturation, brightness, contrast, offset and gain) shall be controllable through the video imaging application.

An on-board RS-232C serial interface shall provide integration of the camera. All camera controls, video signals and operating power shall be supplied through this single RS-232 connection. A software controlled, optically isolated contact closure shall enable synchronized triggering of a professional grade flash unit.

D. Camera

The camera shall be an 1/3" inline transfer CCD color camera. The camera shall connect to the image capture/camera control board through a single RS-232C connection. All camera control functions: white balance, back-light, iris, brightness, hue, saturation, and contrast shall be controlled through the operator workstation keyboard. The camera shall be equipped with an auto-focus lens with PC controlled zoom. The camera kit supplied with the Video Imaging subsystem shall include the camera, professional grade electronic flash with power supply, and camera stand.

June 07, 2002

E. ID card printer

The Video Imaging subsystem shall be capable of using industry standard direct to PVC dye diffusion thermal transfer printers for the production of identification cards. These printers shall be capable of printing to either standard PVC blank cards or access control cards containing magnetic stripe, proximity and/or Wiegand technologies. ID card printers may be connected directly to the image capture workstation or be a shared printer on the Local Area Network.

At a minimum, the printers shall meet the following performance requirements:

- (a) Dye sublimation and Resin Thermal transfer
- (b) Print Resolution of 300 dpi, up to 16.7 million colors
- (c) Print speed for CMYKO (cyan, magenta, yellow, carbon black, overlay) printing approximately 30 seconds
- (d) Washable, replaceable card cleaning rollers
- (e) CR80 (2.125" H x 3.375" W) card stock
- (f) Print within 2 mm of card edge
- (g) Card hopper feeder with 100 card capacity
- (h) 2MB RAM capable of buffering cards queued for printing
- (i) Windows 95/98 and NT compatible 32 bit printer driver

F. Report Printers

The Video Imaging subsystem shall support industry standard, Windows 95/98 compatible laser and ink jet printers as report printers. These printers can be connected to any workstation in the Local Area Network. Report printers shall operate as any standard Windows 95/98 printer.

G. Image Storage

Images captured with the Video Imaging subsystem shall be stored on a centralized image server, allowing all authorized operator workstations the ability to retrieve and view the images. The image server shall have adequate disk space to store images for the specified number of card holder records. The image server shall be equipped with removable magnetic storage media for backing up the stored images onto a single media unit, i.e. tape, Zip drive, Jazz drive, etc.)

Images shall be stored using a file naming scheme which links to the card holder record. It should be readily apparent to someone with minimal knowledge of the card holder record database to find the associated image in the directory where images are stored. This shall be used for importing and exporting of images for use by the Security Management Control System and other systems needing access to the store images.

Images shall be stored in industry standard graphics formats, including JPEG, TIFF, TARGA, PCX, BMP, WMF and PICT. The system shall allow images of the various formats to be stored and displayed by operator workstations.

JPEG is the preferred method of image compression and storage. When storing images in JPEG format, the operator shall be able to set an image quality/compression threshold. The average image size using JPEG compression shall be around 15KB per image.

H. Signature Capture

The Video Imaging subsystem shall have the capability of capturing and storing signatures. These signatures may be printed on the identification cards and/or included in reports.

June 07, 2002

The system shall accept a variety of different signature capture devices, including signature capture pads such as the Penware tablet, or other types of devices which support common interface drivers such as TWAIN or Video for Windows.

Signatures captured with the Video Imaging subsystem shall be stored on the centralized image server, allowing all authorized operator workstations the ability to retrieve and view the signatures. The image server shall have adequate disk space to store signatures for the specified number of cardholder records. The image server shall be equipped with removable magnetic storage media for backing up the stored signatures onto a single media unit, i.e. tape, Zip drive, Jazz drive, etc.)

Signatures shall be stored using a file-naming scheme which links to the cardholder record. It should be readily apparent to someone with minimal knowledge of the cardholder record database to find the associated signature in the directory where signatures are stored. This shall be used for importing and exporting of signatures for use by the Security Management Control System and other systems needing access to the store signatures.

Signatures shall be stored in industry standard graphics formats, including JPEG, TIFF, TARGA, PCX, BMP, WMF and PICT. The system shall allow signatures of the various formats to be stored and displayed by operator workstations.

JPEG is the preferred method of image compression and storage. When storing signatures in JPEG format, the operator shall be able to set an image quality/compression threshold. The average image size using JPEG compression shall be around 15KB per image.

The signature capture interface shall allow the operator to crop the signature, removing excess white space. The operator shall also be allowed to manipulate the capture line thickness and scaling of the signature.

I. Identification Badge Design Tool

The Video Identification subsystem shall include a complete identification badge design and layout tool. The badge design and layout tool shall make use of a what-you-see-is-what-you-get (WYSIWYG) editor, including drag and drop placement. The operator shall use the mouse to size image and text object fields, dragging the layout box in both horizontal and vertical directions. The mouse shall also be used to move objects around on the badge layout.

At a minimum the badge design tool shall provide the following feature:

- (a) Horizontal or Vertical badge orientation
- (b) Badge Rotation
- (c) Layout grid, with user definable sizing, element alignment to grid and snap to grid layout
- (d) Layering of badge elements with Move to Front and Move to Back controls
- (e) Proportional stretching
- (f) Static Images
- (g) Static Text
- (h) Text controls -
 - Font - any standard Windows text font
 - Color - any standard Windows text color
 - Format - standard Windows text formats, i.e. normal, bold, italic, bold italic
 - Size - standard Windows text sizes

- Automatic Shrink-to-Fit within defined text box
- Text justification, i.e. horizontal (left, center, right)
- Text alignment, i.e. vertical (top, center, bottom)
- (i) Transparent or colored text background boxes
- (j) Text angle and orientation

The badge design tool shall allow the operator to place a user defined background image onto the card. This background image may be imported from standard graphics formats, JPG, TIF, TGA, BMP. The operator can select whether the background image shall be printed onto the card, or displayed only, for use with preprinted card stock.

The badge design tool shall be able to link to fields defined in the card record. These fields and the associated data may be placed on the badge. The badge design tool shall allow images and graphics to be placed onto the card, correlating to data in the card holder record. For example a different logo depicting the department may be place the badge depending upon the department name entered in the card holder record.

The system shall allow the system operator to place multiple objects, such as stored photograph image, onto the identification badge. The system shall allow the operator to vary the intensity of these objects as they displayed on the badge. This shall allow a copy of the object to be placed onto the card in an intensity similar to a watermark.

J. Magnetic Stripe encoding

The Video Imaging subsystem shall provide the ability to automatically encode information on magnetic stripe cards as part of the identification card production process. The system shall support programming of Tracks 1, 2 & 3. Information to be included in the magnetic stripe encoding shall be extracted from data in the card holder record.

K. Encoded Expiration dates

The encoding system shall provide the ability to encode the card number and include expiration date in the encoded card number.

L. Operation

As previously stated, the imaging subsystem shall share a common database with the Security Management Control System. In addition to producing an identification badge, the Video Imaging subsystem shall capture and store an image linking it to the personnel record maintained by the Security Management Control System. The images shall be available for viewing by all authorized Security Management Control System workstations.

M. Image Capture

While viewing a card holder record, the system shall allow an authorized operator to press an on-screen button and perform image capture operations.

The image capture operation shall allow the operator to perform the steps necessary to capture the image and produce an identification badge.

N. Badge layout selection

The operator shall be presented with a pull down box which allows the operator to select one of the defined badge layouts. Once the image has been captured and stored, the system shall maintain a link to the badge layout which was assigned to the card holder.

O. Image capture

The system shall provide the operator with an on-screen control button to initiate the image capture sequence.

The operator shall be presented with a live video window on the workstation screen which shows the subject. If the subject is not centered in the frame, through use of the mouse, the operator shall be able to frame the subject. It should not be necessary for the subject to move left, right, up or down in order to become centered in the frame. Only in extreme circumstances shall it be necessary for the operator to physically adjust the camera placement, alignment or angle.

When the subject has been centered in the frame, the system shall allow the operator to perform camera zoom functions from on-screen controls. Manual manipulation of the camera zoom or focus should not be required.

When the subject is properly framed, the operator shall capture the image through the use of an on-screen, mouse or keyboard, command. The image shall be displayed on the operator's workstation in a preview mode. If the captured image is acceptable, the operator shall issue a command to store the image. If the captured image is not acceptable, the operator can discard the image and recapture the image. Images shall only be stored on the image server upon a save image command issued by the system operator.

P. Camera commands

To allow the operator to adjust for lighting conditions and capture the best quality image, the Video Imaging Subsystem shall provide a number of camera and image controls. These controls shall be used prior to image capture and storage and shall not be used to manipulate images that have already been captured.

These controls shall include:

- (a) live iris sensitivity when flash unit is not used
- (b) iris sensitivity when flash unit is used
- (c) iris delay to synchronize with the operation of the flash unit
- (d) camera back-lighting compensation
- (e) camera white balance
- (f) image hue, saturation, brightness and contrast

Q. Badge preview and printing

When the image has been captured and a badge layout selected, the operator shall be able to print the badge on the badge printer.

When the print badge command is selected, the system shall display to the system operator a print preview of the badge. This print preview shall reflect the badge that shall be produced on the badge printer. If the print preview is correct, the operator shall be able to issue the print badge command. If the print preview is incorrect, the operator shall be able to choose to abandon the badge printing process and return to the image capture screen.

R. Image viewing

The Video Imaging Subsystem shall provide an on-screen control for the operator to retrieve and view the card holder's stored image. If the system does not have a stored image of the card holder, an informational message stating such shall be displayed to the system operator.

S. Event monitoring

Because the Video Imaging Subsystem and the Security Management Control System share a common database, it shall be possible for an Event Monitoring Workstation operator to retrieve stored images.

The Event Monitoring Workstation may be configured by the operator to display the images either automatically, based upon the card holder's access card being presented to a reader, or by

manual operator command. The image display window size and location shall be set by the system operator.

When the automatic image display is set, the operator shall be allowed to filter the images displayed to display the images on an access granted event and/or an access denied event. When images are automatically displayed, the images shall remain on the operator's screen until the image window is manually cleared by the system operator. The system shall allow the operator to select whether the latest image is displayed or whether all images are display in a cascading flow and each image window manually closed by the system operator.

Each access event displayed on the operator workstation shall contain an image recall icon. The operator shall be able to manually recall a card holder's image by mouse clicking on the display image icon and choosing the display image option. The system shall provide a different image icon to indicate whether or not an image of the card holder has been captured and stored.

3-21 ADVANCED PROCESSING CONTROL FIELD PANEL

A. General

The Access/Alarm advanced processing field panel shall be a self-contained, microprocessor (Motorola 68000 series) controlled field panel. The panel shall serve as the data collection and communications interface between the Host and the various field devices such as card readers, alarm inputs and control outputs. The field panel shall have the ability to operate as an elevator control device. The panel shall operate in local decision mode. Configuration information (i.e. card records, time commands, door/monitor point/control point configuration, etc.) shall be downloaded from the host computer. Local programming at the field panel shall not be required.

B. Configuration

The field panel controller shall be available in two (2) different configurations. One panel shall be able to control up to eight (8) card readers, one hundred twenty eight (128) alarm points and one hundred ninety two (192) relay control points. A field panel controller configuration that controls up to two (2) card readers, thirty six (36) alarm points and thirty eight (38) relay control points, shall also be available. It shall be possible to operate both the eight door and the two door field panels on the same hard wired communication communications line to the host computer.

3.22 MODES OF OPERATION

A. Local Decision

The field panel shall be connected to the host computer via a hard wired or dial up modem communication path. In the local decision mode, the field panel shall process activity based upon information resident in the field panel's memory. The field panel configuration and card holder record information shall be downloaded from the host computer. Local decision events will be reported to the host computer for historical logging. Local decision events shall include access attempts, scheduled locking/unlocking of doors, schedule arming/disarming of alarm points, scheduled activation/deactivation of output relays, and linking output relays to the state of alarm points. While the field panel is not in communication with the host computer, the panel shall continue normal operation and shall utilize available memory for storage of off-line events. Off-line events shall be reported to the host computer when communications are re-established.

B. Elevator Control

In the elevator control mode, the field panel shall be used to allow/ disallow the activation of elevator floor selection buttons based upon the presentation of an access

card. The field panel shall be connected to the host computer via a hard wired communication path. The elevator floor selection buttons shall be wired through the output relays on the field panel. Upon presentation of an access card, the field panel will determine the floors the cardholder is authorized to access. The relays corresponding to the authorized floors will be activated allowing the card holder to select the appropriate floor.

The field panel shall be capable of being configured to control multiple elevators and/or doors. The eight (8) reader field panel shall allow up to eight (8) elevator cabs to be configured on the panel, controlling access for up to a combined one hundred seventy six (176) floors.

It shall be possible to configure inputs on the field panel, allowing tracking of the floor selected by the cardholder. Once a floor has been selected, this shall cancel out all other floor selection buttons, so that only one floor may be selected per card presentation.

3.23 CONSTRUCTION

A. Cabinet

The field panel shall be housed in a locking 18 gauge metal cabinet, suitable for wall mounting. All cabinet locks shall be keyed alike. The cabinet shall be equipped with a tamper switch on the front door and on the back of the unit. Tamper alarms shall automatically report to the host computer when activated. The cabinet shall be suitably sized to allow installation of the panel, all expansion modules and associated field wiring. The cabinet door shall include illuminated diagnostic indicators which shall indicate the status of the panel.

B. Modular Expansion

The field panel shall be expandable in a modular fashion, requiring only those modules necessary for the application. Where possible the expansion shall be accomplished via the use of field installable modular components. The supported modular components shall include card reader modules, reader communication wiring modules, alarm input and relay control modules.

C. Panel Operating Program

The field panel shall be constructed utilizing CMOS components, including a 16 bit processor and static RAM. The local operating program shall be via preprogrammed Flash read-only memory (ROM). The Flash ROM firmware easy upgrade of field panel functionalities, allowing the panel control program to be downloaded from the host computer.

D. Memory

The field panel shall utilize Static Random Access Memory (SRAM) for storage of configuration and card holder record information.

The SRAM shall maintain configuration and card holder information for up to eighty (80) hours when normal operating power is disconnected from the field panel.

E. Clock and Calendar

The field panel shall include an integral time/ date clock, with a maximum of (+/-) 2.5 seconds drift per day. The calendar function shall include leap year capabilities. Each field panel shall be capable of operating on a time setting different from the host,

thereby allowing for the use of universal time commands regardless of time zone differences.

F. Operating Power

The field panel shall operate on 12 VDC, via a regulated power supply, installed in the field panel cabinet, or via an external battery backup unit operating up to a maximum of 13.8 VDC. The field panel shall provide necessary power to all card readers and expansion modules.

The battery backup unit shall be available in configurations which support up to two (2) seventeen (17) amp hour batteries. The battery backup unit shall provide a minimum of four (4) hours of standby operating power, regardless of the configuration of the field panel.

G. Wiring connections

Field wiring shall be connected to the field panel through the use of screw clamp type connectors which can be removed from the field panel. These connectors shall allow the replacement of modules without requiring the disconnection of field wiring. The contact pins on the field panel shall be spaced in such a manner as to prevent cross wiring of neighboring connections.

The eight door field panel shall provide connections for eight (8) Form C relays, eight (8) Class A supervised alarm point inputs, reader bus supporting up to eight (8) reader modules, host communication, diagnostics/local printer and expansion modules. The installation of expansion modules shall allow the panel to support up to one hundred twenty eight (128) alarm inputs and one hundred ninety two (192) output relays. Dedicated alarm input shall be provided for monitoring the cabinet tamper switches and the AC status output of a battery back-up unit.

H. Alarm Inputs

The Class A supervised alarm inputs shall utilize end-of-line resistors, providing four (4) states of the alarm circuit (normal, alarm, open circuit, shorted circuit). The same end-of-line resistor values shall be used by all supervised alarm inputs connected to the field panel or any expansion module.

I. Relay Outputs

The relay contacts on all auxiliary modules shall be rated 30VDC 2A non-inductive load or 1A inductive load/125VAC 0.4A. The relay contacts on the field panel shall be UL rated for 3A and 36VAC/DC.

J. Switches

The field panel shall contain rotary switches for setting the unit address. The address settings can be set from 0 - 255 (00-FF hex). The two door controller shall support address setting of 00-31. The field panel shall also contain DIP switches used to set local control functions of the panel. Standard operation of the panel shall occur while all DIP switches are in the off (factory default) position.

K. Operating temperature

The field panel shall operate in a temperature range of thirty two (32°) to one hundred fifty eight (158°) degrees Fahrenheit. (0° to 70° C). Temperature range for use with battery backup shall be 32° to 122° F (0° to 50°C).

3.24 COMMUNICATION

A. General

The communication between the field panel and the host computer shall be either a hard wire connection (dedicated line or computer network) or dial-up modem. Hard wired systems may operate using either RS232 or RS485 communications protocols. RS232 communications shall be supported for communication between the host and a single field panel, provided the field panel is located no more than fifty (50) feet from the host computer (using standard cabling practices). Line drivers and fiber optic cabling/transceivers, specified by the field panel manufacturer, may be used to extend the 50 foot limitation. Multiple field panels connected to a single port on the host shall communicate utilizing RS485 multi-drop communications bus. Utilizing the bus topology, a maximum sixteen (16) field panels shall be connected to a single host port. The maximum distance of the bus wiring shall not exceed four thousand (4000) feet. The four thousand (4000) foot distance limitation may be extended using manufacturer approved fiber optic cabling and transceivers.

It shall be possible to operate both the eight door and the two door field panels on the same communications line to the host computer.

The host communication speed shall be configurable on the field panel dependent upon the installation requirements. Acceptable baud rates shall be from 300 to 19200 bits per second, with 19200 being the preferred communication baud rate.

Through the use of additional field installed modules, it shall be possible to establish a redundant communication bus between the host and the field panels and from field panel to field panel. In the event one communications cable fails, an automatic fail-over to the backup communication line shall occur, without affecting the operation of any field panel. In the event a communication line is cut, this shall be reported to the host via connection to a field panel alarm input.

Using fiber optic cabling, it shall be possible to construct a self healing communications ring. In the event a communication fault, the ring shall automatically recover from the failure, preventing total communications failure.

Cable type, wiring configuration and grounding practices shall follow manufacturer's specifications.

B. Dial-Up Operations

The field panel shall provide the capability for remotely located units to communicate with the host computer using standard dial-up telephone lines. The field panel and host shall each be able to initiate communications using an encrypted password scheme for security. Dial-up shall be triggered by a number of user-defined conditions including event activation, time, buffer capacity, and operator manual commands.

While a unit is operating in dial-up mode, all decision making activity related to access, door, alarm and control point will be based upon information resident in the field panel memory. All activity shall be stored in a buffer and reported to the host computer based upon the priority assigned to that particular event. At all times, the access decision shall verify if the card holder record is valid and is authorized for access at the presented reader on the day and at the time the card was presented. The access decision shall not be based solely upon a company or site code encoded on the access credential.

The dial up configuration will require a dedicated modem at each remote field panel with shared modems at the host computer.

C. Programming/ Data Downloading

Data necessary for the field panel to operate shall be programmed into the host computer. The host computer will perform the data downloads to the field panels. It shall not be necessary to perform programming locally at the field panel. The data to be downloaded to the field panel shall consist of configuration information and cardholder records. Only the information directly related to the operation of the individual panel shall be downloaded.

Configuration downloads shall include, but not limited to, the system time and date as well as information related to scheduled activities, holidays, card reader doors, alarm monitor points, output relays, elevator control, anti-passback regions, encoded card formats, facility and site codes.

Cardholder record information shall be user configurable to consist of the card number, card issue code, personal identification number, activation and expiration dates and doors/times the cardholder is allowed access.

Configuration downloads shall automatically occur as modifications are entered into the host computer database. This download shall include only the modified data.

A download of all configuration information shall automatically occur when a field panel recovers from a loss of communications with the host computer.

A configuration download shall also occur in response to an operator command.

Cardholder record information shall be automatically downloaded to the appropriate field panel as modifications are made to the cardholder record.

D. Alarm Monitoring Cycle

The field panel shall be configured with Class A monitor points which will report four (4) states; normal, alarm, open circuit, shorted circuit. The field panel shall interrogate each monitor point every 480 milliseconds. If there is a change of state, the field panel shall determine if the action is appropriate for that time and date. Unscheduled actions shall be reported to the host computer. The field panel shall allow the configuration where auxiliary relays/ outputs shall be linked to the state of the monitor points (i.e., monitor point alert = auxiliary relay active).

The monitor point must remain in a state for successive poll cycles before the change of state is acted upon by the field panel.

E. Automatic Time Schedule Control

The field panel shall allow up to two hundred fifty six (256) automatic time commands for any reader, monitoring input, or auxiliary relay/output connected to the field panel. These automatic time commands shall include door locking/unlocking, arming/disarming of alarm monitor points and setting/resetting of auxiliary relays/outputs. The automatic time commands shall consist of segments of time (HH:MM - HH:MM) and days of the week, including holidays. The field panel shall have the ability to store twenty (20) defined holidays.

F. Diagnostics

The field panel shall contain/support several means for determining the state of the panel. This shall include but not be limited to a cabinet door display, diagnostic LED bar, communications LEDs and a full function diagnostic program.

The door of the field panel cabinet shall have an illuminated status display to allow personnel to determine the state of the panel, without need to open the cabinet. The status shall indicate Power, Host Communication and Fault detected.

Each time the field panel is powered, the panel shall go through an automatic diagnostic cycle. If a problem is detected, it shall be displayed on the LED bar. The LED bar shall contain indicators for fault, reader error, card swipe, monitor point change of state, host communication, program watchdog and power. The field panel shall contain additional LEDs to indicate communications with the host computer and between the field panel and readers.

A full function diagnostic program shall be available to assist in the installation and troubleshooting of the field panel. The diagnostic program shall be run on an MS-DOS based computer. A diagnostic port on the field panel shall be available for connection of the diagnostic program. The diagnostic program shall operate while the field panel is in either stand-alone or host communication mode, without causing interference with the normal operation of the panel. The program shall display information in real time status. The diagnostic program shall contain a battery of tests related to the configuration of the field panel. These tests shall indicate firmware version, RAM size, ROM size, cabinet tamper, power, host communication, panel address and clock setting. The diagnostic program shall provide information related to the configuration of all reader modules and the status of the alarm and control points on each reader module. The diagnostic program shall contain modules to allow various components of the field panel to be exercised. These shall include the diagnostic LED bar, monitor point status LEDs and auxiliary relays/outputs. The diagnostic program shall allow auxiliary relays/outputs to be set, reset and cycled. The cycling time shall be user definable. The diagnostic program shall display raw card read data. Dynamic monitor point status displays shall also be provided.

3.25 EXPANSION MODULES

A. General

Optional expansion modules shall be available for the field panel, allowing each panel to be configured in a manner to meet the installation requirements. These expansion modules shall include Star Coupler modules for connecting readers, Supervised Alarm Input modules, and Relay Output modules. The Supervised Alarm Input modules and the Relay Output modules shall be available for installation either as a daughter board directly mounted on the field panel or for installation on the field panel reader bus. External devices shall be connected to the expansion modules utilizing the same screw clamp connectors used on the field panel.

B. Star Coupler Module

The Star Coupler module shall be mounted in the eight door field panel cabinet and allow reader modules to be connected to the field panel in either a star or bus configuration. This module shall include eight (8) unsupervised alarm inputs and eight (8) Form C relays. The Star Coupler module is used only on the eight door field panel.

C. Wiegand/Proximity Star Coupler Module

The Wiegand/Proximity Star Coupler (WPSC) module shall be mounted in the eight door field panel cabinet in place of the Star Coupler module. This module shall incorporate the electronics, normally located on the reader modules, onto a multi-reader module, thereby allowing multiple Wiegand and/or Proximity read heads to be connected to the field panel. The WPSC module

June 07, 2002

shall be provided in a two (2) board stacked layout, with each module supporting four (4) readers. The Wiegand/Proximity Star Coupler module shall include a jumper setting to supply either +12 or +5 VDC to reader modules. The Wiegand/Proximity Star Coupler module shall include DIP switches for addressing each reader, allowing the WPSC to be used in conjunction with external reader modules. The WPSC shall support readers with bi-colored LEDs, allowing the LED to be Red, Amber or Green. The Wiegand/Proximity Star Coupler module is used only on the eight door field panel.

D. Supervised Alarm Input Modules

Alarm input expansion modules shall be available. One module shall provide connections for thirty two (32) Class A alarm inputs. The Supervised Input module shall mount directly on the eight door field panel. The supervised alarm inputs shall use end-of-line resistors, providing four (4) states of the alarm circuit (normal, alarm, open circuit, shorted circuit).

A Supervised Alarm Input reader bus module shall be available for installation on the field panel card reader bus. The supervised alarm inputs shall use end-of-line resistors, providing four (4) states of the alarm circuit (normal, alarm, open circuit, shorted circuit). Each Supervised Alarm Input reader bus module shall contain eight (8) supervised alarm inputs.

A maximum of eight (8) Supervised Alarm Input reader bus modules may be connected to a field panel. When the two (2) door controller is used, a maximum of four (4) Supervised Alarm Input reader bus modules may be connected to a field panel.

The Supervised Alarm Input reader module shall communicate with the field panel utilizing two (2) wire RS485. The Supervised Alarm Input reader modules shall be connected to the field panel in either a bus or star configuration, whichever is most appropriate for the installation. Supervised Alarm Input reader modules shall not be installed in excess of four thousand (4000) feet from the field panel. The four thousand (4000) foot distance limitation may be extended using manufacturer approved fiber optic cabling and transceivers.

The module shall operate on 7.5 to 13.8 VDC. Power for the module shall be supplied by the field panel or local power supply. All data and power wiring shall be in accordance with manufacturer's specification.

E. Output Relay Modules

An auxiliary relay/output module shall be available for installation on a field panel. The module shall include forty eight (48) Form C relays. A maximum two (2) of these auxiliary relay/output modules may be installed on an eight field panel. The relay contacts shall be rated 30VDC 2A non-inductive load or 1A inductive load/125VAC 0.4A.

An Output Relay reader bus module shall be available for installation on the field panel card reader bus. The relay contacts shall be rated 30VDC 2A non-inductive load or 1A inductive load/125VAC 0.4A. The Output Relay reader bus module shall contain eight (8) Form C relays.

A maximum of eight (8) Output Relay reader bus modules may be connected to a field panel. When the two (2) door controller is used, a maximum of four (4) Output Relay reader bus modules may be connected to a field panel.

The Output Relay reader module shall communicate with the field panel utilizing two (2) wire RS485. The Output Relay reader modules shall be connected to the field panel in either a bus or star configuration, whichever is most appropriate for the installation. Output Relay reader

modules shall not be installed in excess of four thousand (4000) feet from the field panel. The four thousand (4000) foot distance limitation may be extended using manufacturer approved fiber optic cabling and transceivers.

The module shall operate on 7.5 to 13.8 VDC. Power for the module shall be supplied by the field panel or local power supply. All data and power wiring shall be in accordance with manufacturer's specification.

3.26 CARD READERS

A. General

The field panel shall support up to eight (8) card readers per panel and two (2) card readers for the two door field panel. The readers may be multiple card technologies including magnetic stripe, Wiegand, proximity, barium ferrite, bar code and biometrics. Each field panel shall support up to four distinctly different card formats. Each card format shall support four (4) different company and site codes. The card formats shall be assigned to any of the card readers.

B. Reader Interface Module

A reader interface module shall be required for each card reader connected to the field panel. This reader module shall be available as a separate module, integrated into the design of the reader or as a multi-reader, star coupler module. The reader module shall contain a rotary address switch allowing a unique address setting for each reader module connected to the field panel. The reader module shall accept both Wiegand and Clock/Data signals from reader heads. A switch shall be available to set the read head signal format.

The reader module shall communicate with the field panel utilizing two (2) wire RS485. The reader modules shall be connected to the field panel in either a bus or star configuration, whichever is most appropriate for the installation. Reader modules shall not be installed in excess of four thousand (4000) feet from the field panel. The four thousand (4000) foot distance limitation may be extended using manufacturer approved fiber optic cabling and transceivers.

The reader module shall operate on 7.5 to 13.8 VDC. Power for the reader module shall be supplied by the field panel or local power supply. All data and power wiring shall be in accordance with manufacturer's specification.

The reader module shall include two (2) Class A alarm inputs and open collector logic for driving two (2) auxiliary relay/outputs. The reader module shall include a dedicated input for a tamper signal. The tamper switch shall be installed on those reader modules integrated into the reader design. Physical access to the reader module shall not allow activation of the door locking mechanism.

The reader module shall contain an audible sounder. The sounder shall be able to be activated to provide feedback as keys are depressed on the reader keypad. The sounder shall also be able to be activated to annunciate valid access activity.

The field panel shall poll each reader module every 480 milliseconds. If after successive poll cycles, a reader module fails to respond to a poll, the field panel shall illuminate the Reader Off-line LED on the field panel LED bar. The reader failure shall be reported to the host computer.

The reader module shall support three (3) high intensity LEDs - red, amber and green. These LEDs shall indicate various status conditions such as:

Initialization Test	<i>All LEDs pulse</i>
On-line Indication	<i>Amber LED on steady</i>
Off-line Indication	<i>Red LED on steady</i>
Card Accepted	<i>Green LED pulses for door open time</i>
Card/PIN	<i>Amber LED pulses to enter PIN. Subsequent red/green LEDs mimic card input</i>
Alarm Condition	<i>All LEDs pulse in alternating pattern</i>

C. LCD display

The reader module shall support an optional back-lit LCD display. The LCD display shall be capable of displaying time/date and/or other messages utilizing two (2) lines of sixteen (16) characters per line display. The contrast/viewing angle of the LCD display shall be adjusted from the reader module. The reader module shall contain a library of standard messages (i.e. Access Denied, Access Granted, Enter Card, Enter PIN, etc.) with the appropriate message being displayed based upon system activity. The LCD display shall be integrated into the design of the reader housing.

D. Reader Keypad

The reader module shall support a twelve (12) button keypad with tactile response. The keypad may be used for Personal Identification Number (PIN) entry following presentation of an access card or Card Access Via Keypad. The keypad shall be mounted within twenty (20) feet of the reader module or may be integrated into the reader housing.

The reader module with keypad shall support a configuration mode, whereby the keypad may be used as a diagnostic tool to check the operation of the reader module.

E. Standard Proximity Reader Features

The field panel shall have the capability of supporting a variety of proximity reader configurations depending on the requirements of the particular application. These readers shall provide a standard Wiegand signal and shall be connected to the reader module or to the Wiegand/Proximity Star Coupler module. The proximity read head/antenna shall be available either housed in the reader housing with the reader module or as a mullion mount unit. Read heads/antennas, not housed with the reader module, shall be installed within five hundred (500) feet of the reader module or Wiegand/Proximity Star Coupler. Cable type, wiring configuration and grounding practices shall follow manufacturer's specifications.

3.27 DOOR HARDWARE AND PERIPHERAL DEVICES

- A. Request to exit Sensor – The request to exit sensor shall be a Detection Systems DS150i
- B. Electric Door Strikes – The new door strikes shall be 24VDC. Style and type shall be dependant upon door construction.
- C. Door Status Contact – The door status contacts shall be recessed Sentrol Model #1076 Series.
- D. Emergency Release Button – The emergency release button shall be a pneumatic push button, ASP Model #ASP-14.

- E. Overhead Door Contact – The overhead door contacts shall be Sentrol Model# 2207A.

PART 4 – FIBER TRANSMITTERS AND RECEIVERS

4.01 EQUIPMENT

- A. Fiber transmitters and receivers used to transmit video from the fixed camera to the new head-end equipment shall be as follows:
Multimode Transmitter – American Fibertek #RT-10
Multimode Receiver – American Fibertek #RR-10
- B. Fiber transmitters and receivers used to transmit one-way video and bi-directional data from the pan/tilt/zoom domes to the new head-end equipment shall be as follows:
Multimode Transmitter – American Fibertek #RT-1200B
Multimode Receiver – American Fibertek #RR-1200B
- C. The four-channel fiber transmitter and receiver used to transmit the video from all fixed cameras located in Building 100 to the Guard Shack shall be as follows:
Multimode Transmitter – American Fibertek #RT-401E
Multimode Receiver – American Fibertek #RR-401E
- D. Fiber transmitters and receivers used to transmit one-way video and bi-directional data from the pan/tilt/zoom domes located in Building 100 to the new head-end equipment shall be as follows:
Multimode Transmitter – American Fibertek #RT-1200B
Multimode Receiver – American Fibertek #RR-1200B
- E. Fiber transmitters and receivers used for to transmit bi-directional audio between the remote door intercom stations and master intercom station shall be as follows:
Multimode Transmitter – American Fibertek #RT-89A-L
Multimode Receiver – American Fibertek #RR-89A-L
- F. All fiber modules located in data, electrical closets, etc. shall be mounted in a fiber rack. The rack shall include all required power supplies and blank filler panels. The Rack shall be American Fibertek #SR-20/1.
- G. A fiber patch panel shall be located in each data, electrical closet and head-end location for the associated fiber rack and modules. The patch panel shall be American Fibertek #RIC-024ST.
- H. A wall mount rack shall be installed in each data/electrical closet for mounting of the fiber rack and patch panel. The wall rack shall be hinged to allow for easy rear access. The overall dimensions shall be a minimum of 35”H x 21”W x 18”D. Slots shall be available on the top, sides and bottom to accommodate Velcro cable ties. Quick release pins shall be provided to swing the rack open from left or right. The rack kit shall be BlackBox #RM069A or equal.

PART 5 – INTERCOM SYSTEM

5.01 EQUIPMENT

- A. The intercom master station shall be Aiphone #LEF-10 or equal. The master station shall be capable of open voice communication with each individual door intercom station located throughout the facility. The master station shall also be provided with selective door control. This will allow the Guard Shack to unlock specific door by utilizing the door release button on the master station.
- B. Door intercom stations located at interior locations shall be Aiphone #LE-DA or equal. These units shall allow the individual at the door to call the Guard Shack and request entry.
- C. Exterior intercom stations located at turnstiles and gates shall be Aiphone #LS-NVP or equal. The unit shall also be provided with Aiphone surface box #SBX-NVP or equal.

PART 6 – INSTALLATION

6.01 CABLE

- A. All cable shall be provided by the installing contractor and be Plenum rated. Cable shall be intended/designed for use with the above systems. Cables requirements are as follows:
- B. Camera video cable shall be plenum rated RG-59U for camera runs not exceeding 1000 feet (Great Lakes Wire #99531 or equal). For camera runs over 1000 feet but not exceeding 2000 feet, RG-6U coaxial cable shall be used (Great Lake Wire #99631 or equal). All cabling shall be plenum rated, have a solid copper center conductor and copper braided shield (95% coverage). The cable shall also have 75-Ohm Impedance. Aluminum braid cable is not acceptable.
- C. Camera power shall be provided by a minimum of a 2-conductor 18AWG cable, plenum rated. Cable shall be Great Lake Wire #1802PL or equal. Refer to equipment manufacturer equipment specifications for distance limitations based on wire gauge and equipment current draw.
- D. Reader cable shall be a minimum of a 2 conductor shielded cable, plenum rated. Cable shall be Great Lake Wire #3602PL or equal.
- E. Request to exit cabling shall consist of one 2-conductor #18AWG unshielded cable and one 2-conductor #18AWG shielded cable. Both cables shall be plenum rated. Cables shall be Great Lake Wire #1802PL and 3602PL or equal.
- F. Access control communication loop wiring shall be a 2-conductor #18AWG shielded cable, plenum rated. Cable shall be Great Lake Wire #3602PL or equal.
- G. Door strike cabling shall be a minimum of a 2-conductor #18AWG cable, plenum rated. Cable shall be Great Lake Wire #1802PL or equal.

June 07, 2002

- H. Door status contact cabling shall be a minimum of a 2-conductor #18AWG shielded cable, plenum rated. Cable shall be Great Lake Wire #3602PL or equal.
- I. Door intercom cabling shall consist of a 3-conductor #18AWG cable, plenum rated. The conductors shall be non-polarized.
- I. All new cabling that cannot be concealed above drop-ceilings and in walls, shall be installed in EMT conduit.

6.02 120VAC POWER

- A. Electrical Contractor shall be responsible for providing and installing all necessary 120VAC power for control panels, power supplies, head-end equipment, etc. Location of existing power feeds shall be coordinated with

6.03 FIBER OPTIC CABLING

- A. Electrical Contractor shall be responsible for providing all required single and multimode fiber strands. The security system integrator shall provide all fiber transmitters, receivers, fiber patch panels, fiber module rack and wall mount rack kits. Electrical Contractor shall provide all fiber jumper required in the Network Communications Room.

6.04 LAN CONNECTIONS

- A. Electrical Contractor shall provide all LAN Network Drops as described in the RFP. All IP addresses shall be provided to the security system integrator at the time of installation.

6.05 TRANSIENT PROTECTION

- A. Transient protection shall be provided all cabling entering the building from exterior mounted equipment such as cameras, card readers, etc.

6.06 QUALITY

- A. All equipment and cabling shall be installed in a neat and professional manner. All cabling shall be supported per NEC requirements. All cabling routed into control panels, etc. shall be installed in metal raceways. Final connections on all equipment shall be properly labeled and neatly installed. Electrical Contractor shall conduct a final inspection of all work-performed prior to final payment.

END OF SECTION